DOCUMENT RESUME

ED 216 890 SE 037 812

AUTHOR	Crowley, Michael F.; And Others
TITLE	Women and Minorities in Science and Engineering.
INSTITUTION	National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
PUB DATE	Jan 82
NOTE	163p.
EDRS PRICE	MF01/PC07 Plus Postage.
DESCRIPTORS	College Science; Employed Women; *Employment Patterns; *Engineering; Engineering Education; *Engineers; *Females; Higher Education; *Minority Groups; Natural Sciences; Professional Education; Professional Recognition; Racial Differences; Science Education; *Scientists; Secondary Education; Sex Differences; Social Sciences
IDENTIFIERS	National Science Foundation

ABSTRACT

Congress, as part of the Fiscal Year 1981 National Science Foundation Authorization Act (Public Law 96-516), called for the Director of the National Science Foundation to transmit to the Congress and certain Federal agencies a biennial statistical report on the participation of women and minorities in science and engineering employment and training. This report responds to the Congressional directive. Chapter 1, a descriptive overview of the participation of women and minorities in the natural and social sciences and engineering, highlights differences in employment patterns between women and men and between whites and racial minorities. Chapter 2 reviews a series of indicators, such as unemployment rates and salary differentials, to assess relative labor market conditions for scientists and engineers. Chapter 3 examines the acquisition of science and engineering (S/E) skills. Data are presented on the number and proportion of women and minorities earning S/E degrees and on the acquisition of mathematics and scientific skills by women and racial minorities prior to college entry. Statistics indicate that although employment of female and minority scientists and engineers increased between 1974 and 1978, women and blacks are still underrepresented than males and whites respectively. (Author/DC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED216890

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
- Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

Women and Minorities in Science and Engineering

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
NATIONAL SCIENCE FOUNDATION
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

SE037812

National Science Foundation
January 1982

Foreword

The human resources of this country constitute one of its most important assets. This is especially true of individuals with science and engineering skills, who expand the frontiers of knowledge, develop new technologies, and teach future generations. The importance of these activities makes it essential that the best talent be drawn to science and engineering activity from every available pool.

Women and members of minority groups traditionally have had low rates of participation in science and engineering; this has been a cause for concern.

A clear factual picture of the current situation and recent trends in participation is an important prerequisite to rational and effective policy formulation. The 1981 National Science Foundation Authorization Act (Public Law 96-516) calls for the Director of the National Science Foundation to transmit to Congress and selected Government officials a biennial statistical report on the participation of women and minorities in science and engineering employment and training.

I am pleased to be submitting the first volume of this series. This report is unique in its comprehensiveness—both in scope and in data sources used. I am especially gratified by the extensive amount of data that we have been able to bring to bear on these issues. It indicates that we have a substantial amount of statistical capability for identifying the problems and for providing clues to their origin.

The report confirms that the level of participation of women and of several racial and ethnic minorities in science and engineering is low. It also suggests that the problems of low participation may be related to the extent to which these groups participate in math and science training at all school levels—precollege, college, and postgraduate. This fact and others presented in this report will provide a sound basis for informed debate and constructive development of policies and programs to assure full use of the Nation's resources in science and engineering.

I welcome your criticism and suggestions for this new endeavor. We hope that this and future volumes will provide information needed by the Congress and others concerned with the vitality of U.S. science and technology and with the furtherance of equal opportunity for women and minorities in science and engineering.

JOHN B. SLAUGHTER
Director
National Science Foundation

Acknowledgments

This report was developed within the Division of Science Resources Studies by Michael F. Crowley, Senior Staff Associate for Methods and Analysis, Scientific and Technical Personnel Studies Section (STPSS), with the assistance of Melissa J. Lane. Significant contributions to the overall development of the report were provided by Nancy M. Conlon (STPSS). Barbara G. Lucas of the Directorate of Scientific, Technological and International Affairs assisted in the drafting of the report. John A. Scopino provided technical assistance. The report also benefited from useful comments provided by external reviewers and the National Science Foundation's Committee on Equal Opportunities in Science and Technology.

Supervision, review, and guidance were provided by: Alan Fechter, Head, Scientific and Technical Personnel Studies Section; Charles E. Falk, Director, Division of Science Resources Studies; and Harvey Averch, Assistant Director of NSF for Scientific, Technological and International Affairs.

Contents

Page

Executive Summary v

Introduction ix

Chapter 1. EMPLOYMENT OF WOMEN AND MINORITIES IN SCIENCE AND ENGINEERING 1
- Women in Science and Engineering 1
  - Employment Levels and Trends 1
  - Field 2
  - Work Activities and Sector of Employment 2
- Minority Women in Science and Engineering 8
  - Employment Levels and Trends 8
  - Field 10
- Racial Minorities in Science and Engineering 10
  - Employment Levels and Trends 10
  - Field 12
  - Work Activities and Sector of Employment 13
- Hispanic Scientists and Engineers 15
  - Employment Level 15
  - Field 15
  - Sex, Race, Age 15
  - Work Activities and Sector of Employment 15

Chapter 2. LABOR MARKET INDICATORS 17
- Women Scientists and Engineers 17
  - Labor Force Participation Rates 17
  - Unemployment Rates 18
  - S/E Utilization Rates 21
  - Salaries 22
  - Underemployment 24
- Racial Minority Scientists and Engineers 26
  - Labor Force Participation Rates 26
  - Unemployment Rates 26
  - S/E Utilization Rates 26
  - Salaries 27
  - Underemployment 28
- Hispanic Scientists and Engineers 29

Chapter 3. EDUCATION AND TRAINING 31
- Women 31
  - Earned Degrees in Science and Engineering 31
  - Graduate Degree Attainment Rates 32
  - Postdoctoral Appointments 32
  - Mathematics and Science Training 33
- Racial Minorities 34
  - Earned Degrees in Science and Engineering 34
  - Postdoctoral Appointments 35
  - Mathematics and Science Training 35

Hispanics 37
  Earned Degrees in Science and Engineering 37
  Mathematics and Science Training 37

TECHNICAL NOTES 41

APPENDIX TABLES 47

Executive Summary

WOMEN

Representation

Employment of female scientists and engineers rose almost 32 percent between 1974 and 1978, increasing the female share of the total science and engineering (S/E) work force from 7.8 to 9.4 percent. Despite this increase, women were still underrepresented since they constituted over 40 percent of all professional and related workers in 1978.

Representation of women in the total S/E work force varied considerably by field. Roughly one-half of the men, but only 10 percent of the women, were engineers. Women, on the other hand, were concentrated in the fields of social science, life science, psychology, and computer specialties. As a result, the female share of the S/E work force varied from about 2 percent in the fields of engineering and physics to over 20 percent in the social and life sciences and psychology.

There was little difference between men and women in S/E labor force participation. Almost 90 percent of the women in the S/E population were in the labor force (i.e., either working or looking for work). In contrast, only two-thirds of all women who had completed 16 or more years of schooling were in the labor force.

Part-Time Employment

The proportion of S/E women employed part time was seven times as large as that of men, 14 percent vs. 2 percent. About 2 percent of the female S/E work force and less than 0.5 percent of the male work force were working part time but seeking full-time employment.

Employment in S/E Jobs

The proportion of working female scientists and engineers holding non-S/E jobs was about three times larger than that of men, 43 percent vs. 14 percent. The sex differential was considerably smaller for those in the doctoral work force—13 percent for women vs. 9 percent for men. Of the female S/E work force, 4 percent, as compared to 1 percent of the male S/E work force, reported that they were looking for S/E jobs but had to settle for non-S/E positions. Except for computer specialties, this sex difference persisted within most fields of science and engineering.

Salaries

Women scientists and engineers received lower salaries than men. Among experienced scientists and engineers, women received roughly 80 percent of the salaries of men. The differential persisted within fields, types of employer, and types of primary work activity. Women with doctorates in S/E fields also received roughly 80 percent of the salaries received by men ($23,100 vs. $29,900). The ratio, however, increased to about 90 percent when adjustments were made for field, age, race, and sector of employment.

Unemployment

Unemployment rates for female scientists and engineers were higher than those for males (2.4 percent vs. 1.3 percent). Except for life sciences and computer specialties, the difference persisted within fields of science and engineering.

Career Advancement

The proportion of female scientists and engineers reporting management as their primary work activity was less than one-half that of men (12 percent vs. 27 percent). The sex difference persisted within each major field of science and engineering. Within the sciences, roughly 12 percent of the women and 23 percent of the men reported management as their primary work activity. In engineering, the percentages were 10 and 30 percent, respectively. It should be noted that the average age of female scientists and engineers was lower than that of their male counterparts.

Within educational institutions, women with doctorates in S/E fields were less likely to be tenured or in tenure-track positions (59 percent vs. 78 percent). Of tenured faculty, 53 percent of the females and 75 percent of the males held the rank of associate or full professor. These differences persisted after adjustments were made for field, year of receipt of doctorate, and quality of institution from which the doctorate was granted.

Minority Women

Minority women represented 9 percent of the total female S/E population, compared to a 3 percent ratio for minority men. Minority women and men were about equally represented in their respective doctoral S/E work forces (9 percent). Black women represented a larger proportion of the female S/E population than black men of the male S/E population (5 percent vs. about 1 percent).

Training

Although still underrepresented, women have been increasing their participation in S/E training. They earned 36 percent of the S/E bachelor's degrees awarded in 1980, up from 26 percent in 1970; 27 percent of the master's degrees, up from 17 percent; and 22 percent of doctorates, up from 9 percent. To provide some perspective, roughly 50 percent of the 1976 class of high school graduates were women. The gains in S/E degrees occurred within almost all fields of science and engineering, although there was still considerable field variation in female rates of participation. For example, in engineering, relatively few degrees were awarded to women (10 percent of the bachelor's degrees), while in the social sciences a substantial fraction (51 percent) were awarded to women.

The lower female rate of participation in S/E training may be due to differences in precollege preparation, role models, expected job opportunities, and a host of social, cultural, and psychological variables. Data available on the first of these show that between 1972 and 1978, fewer female high school students took 4 years of mathematics, but the difference between female (22 percent) and male (39 percent) students has been narrowing. Roughly similar proportions of college-bound male and female high school seniors took 2 or more years of biological science in 1980, but female seniors were only one-half as likely as males to have taken 3 or more years of physical science (15 percent vs. 30 percent).

These variations in precollege preparation may affect female-male differences in scores achieved on national mathematics and science tests. Differences in mathematics scores at the ages of 9 and 13 have been slight; however, by age 17, test scores of males were higher than those of females. On science tests, however, females scored consistently lower than males at ages 9, 13, and 17.

Female scores on the mathematics component of the Scholastic Aptitude Tests were slightly below those of males. Women and men who majored in science and engineering at the undergraduate level earned roughly similar scores on the quantitative and analytic portions of the Graduate Record Examination.

RACIAL MINORITIES

Representation

Employment of scientists and engineers belonging to racial minority groups rose by almost 25 percent between 1974 and 1978 (to 90,000), increasing their share of the S/E work force to about 4 percent.

Despite this gain, blacks were still underrepresented. Although blacks constituted about 7 percent of all professional and related workers, they represented only 1.6 percent of the S/E work force. Asians, who represented about 2 percent of the S/E work force, were not underrepresented. A considerable fraction of Asian scientists and engineers (for example, over 90 percent of those in the doctoral S/E work force) were foreign born.

Representation of racial minority scientists and engineers in the S/E work force—particularly blacks—varied considerably by field. Blacks were concentrated in the social sciences and psychology, where they represented almost 5 percent of the total. At the other extreme, blacks represented only 1 percent of the engineering work force. Native Americans with doctorates were also concentrated in the social sciences and psychology; about one-half were in these fields.

Regardless of race, scientists and engineers showed strong attachment to the labor force; however, the ties for members of racial minorities were somewhat stronger than those for whites. About 95 percent of both blacks and Asians in the S/E population were in the labor force in 1978, compared with 91 percent of the whites.

Part-Time and S/E Employment

Among experienced scientists and engineers, there was little difference among racial groups in part-time employment patterns. A slightly smaller proportion of blacks, however, was employed in S/E jobs (88 percent for black doctorates vs. 92 percent for whites and 94 percent for Asians).

Salaries

Scientists and engineers in the experienced S/E labor force who were members of racial minorities received lower salaries than whites ($24,900 for blacks and $25,800 for Asians vs. $27,300 for whites). There were, however, some notable exceptions to this general pattern. Black engineers, for example, generally received higher salaries than white engineers.

Unemployment

Unemployment rates did not generally differ in 1978 among racial groups in the S/E labor force; the rates hovered around 1.5 percent. In 1980, however, unemployment rates for black scientists and engineers with little experience (4.7 percent) were considerably higher than those of other racial groups.

Career Advancement

There was little difference among racial groups either in the proportion of the experienced S/E work force reporting management as their primary work activity or in the proportion of academically employed S/E doctorates at the associate and full professor level.

Training

Members of racial minorities earned a small fraction of the S/E degrees awarded. In 1979, blacks earned 6 percent of the bachelor's degrees, almost 4 percent of the master's degrees, and less than 3 percent of the doctorates.By comparison, blacks constituted about 12 percent of the 1978 class of high school graduates. Although Asians earned 2 percent of the S/E bachelor's degrees and almost 4 percent of master's degrees and doctorates, they represented only 1 percent of the 1978 high school graduates. Of those Asians earning S/E doctorates in 1979, however, a large fraction (84 percent) were not U.S. citizens.

Although black participation in engineering training has been increasing rapidly—by over 100 percent between 1972 and 1980 (to 1,300)—blacks were awarded only 2 percent of the engineering degrees in 1980.

The lower participation on the part of the blacks in S/E training may be a result of differences between blacks and members of other racial groups in their precollege preparation in mathematics and science, role models, expected job opportunities, and a variety of social, cultural, and psychological variables. Data available on the first of these show that in 1978, black high school seniors took fewer courses in mathematics than whites. Three-quarters of the whites had taken Algebra I, for example, compared with 55 percent of the blacks. In the sciences, blacks took about the same amount of physics as whites (20 percent), but relatively fewer blacks took chemistry (28 percent of blacks vs. 39 percent of whites).

The differences in precollege preparation were partially reflected in racial differences in scores achieved on mathematics and science tests. The average score of blacks at age 9 (55 percent correct responses) was 13 percentage points lower than that of whites of comparable age (68 percent correct responses) on mathematics knowledge tests administered as part of the National Assessment of Education Progress. The difference widened to 18 percentage points by age 17 (56 percent vs. 74 percent). At age 17, there was an 18 percentage point difference (38 percent vs. 56 percent) on science tests.

Blacks scored lower than whites on the mathematics portion of the Scholastic Aptitude Test (355 vs. 490), and lower on the Graduate Record Examination than either whites or Asians. For example, on the quantitative component of the GRE, blacks who majored in engineering at the undergraduate level scored 521, compared to 675 for both whites and Asians.

HISPANICS

Representation

Hispanics constituted less than 1 percent (2,500) of the doctoral S/E work force in 1979, but over 2 percent of the professional and related work force.

The field distribution of doctoral S/E Hispanics was similiar to that of all doctoral scientists and engineers. A slightly larger proportion of Hispanics were psychologists and slightly smaller proportions were engineers and environmental scientists.

Career Advancement

Relatively fewer academically employed Hispanics with S/E doctorates were tenured. Of S/E doctorates receiving degrees between 1960 and 1978, 54 percent of the Hispanics and 62 percent of the total were tenured in 1979.

Training

Hispanics earned about 3 percent of the bachelor's degrees in science and engineering fields, 2 percent of the master's degrees, and 1.4 percent of the doctorates. In comparison, slightly over 4 percent of the 1978 cohort of high school graduates was Hispanic.

Hispanic high school students at age 17 scored below the national average on mathematics tests (60 percent vs. 72 percent) and on science tests (43 percent vs. 54 percent).

Hispanics scored lower than non-Hispanics on the Graduate Record Examination within each field of undergraduate major. There was substantial variation in test scores among the different Hispanic subgroups. For example, on the quantitative portion of the exam, whites whose undergraduate major was in the mathematical sciences scored 682, while Latin Americans scored 620, Mexican-Americans scored 595, and Puerto Ricans scored 500.

Introduction

Congress, as part of the Fiscal Year 1981 National Science Foundation Authorization Act (Public Law 96-516), called for the Director of the National Science Foundation to transmit to the Congress and certain Federal agencies a biennial statistical report on the participation of women and minorities in science and engineering employment and training. This report responds to that Congressional directive.

Chapter 1, a descriptive overview of the participation of women and minorities in the natural and social sciences and engineering, highlights differences in employment patterns between women and men and between whites and racial minorities. Chapter 2 reviews a series of indicators, such as unemployment rates and salary differentials, to assess relative labor market conditions (i.e., employment relative to available supply) for scientists and engineers. Chapter 3 examines the acquisition of science and engineering (S/E) skills. Data are presented on the number and proportion of women and minorities earning S/E degrees and on the acquisition of mathematics and scientific skills by women and racial minorities prior to college entry.

Generally, the National Science Foundation (NSF) definition of scientists or engineers includes: those who hold at least a master's degree in mathematics, biological sciences, psychology, or the social sciences; those who hold only a bachelor's degree in these fields and are employed in a science or engineering job; and those who hold at least a bachelor's degree in engineering or in any science field other than those listed above. A more complete discussion of these criteria can be found in the technical notes at the end of this report

Much of the information presented in this report is derived from sample surveys and is subject to limitations of sampling and less than full or inaccurate responses. Because of the relatively small number of women and minorities in science and engineering, data for these groups are not as statistically reliable as those for males and whites. However, any comparisons between women and men between minorities and the majority presented in the text of this report are statistically significant at least at the .05 confidence level (i.e., the reported difference could be due to chance only 5 or fewer times in 100). Information pertaining to the statistical reliability of much of the data in this report can be found in the technical notes.

In all chapters, data are presented first for women and then for minorities. This order does not reflect priorities, rather it reflects the fact that there are more statistically reliable data available for women. Statistical information on the participation of native Americans and Hispanics in science and engineering is particularly limited because of sample size and high levels of nonresponse to survey questions relating to Hispanic status. Thus, much of the data presented on racial minorities are focused on blacks and Asians. Hispanics are treated separately since they are an ethnic rather than racial group. Comparisons are made between Hispanics and all scientists and engineers.

Most data are for the 1978-79 period. In some cases more current data are not available because the relevant surveys sponsored by NSF are conducted biennially and because the activities associated with the 1980 Census of the Population imposed constraints on data collection activities. In designing NSF data collection systems for the eighties, emphasis has been given to increasing the samples for women and minorities so that more statistically reliable information will be available in the future. In particular, sex and race will be used as sampling strata in the NSF-supported Postcensal Survey of Scientists and Engineers. This survey will form the base for the overall national estimates of employment of scientists and engineers.

There are some differences in concepts, data collection techniques, and reporting procedures among the statistics presented in this report. Primary data sources listed in the references, technical notes, and appendix tables will provide full information on these technical aspects and on the limitations of the statistics.

CHAPTER 1

Employment of Women and Minorities in Science and Engineering

This chapter focuses on two broad topics: (1) the representation of women and minorities in S/E employment; and (2) differences in employment characteristics between sex or racial groups independent of the overall employment levels. Policy implications of underrepresentation are different from policy implications of differences in employment characteristics.

Representation of women and minorities in the labor market can be determined by comparing the proportion of employed scientists and engineers who are women or members of racial or ethnic minority groups, with the proportion of these groups in some relevant population, generally all professional, technical, and related workers. Level of representation in the labor market, however, tells nothing about the experiences of women and minorities once they are in the labor market. It is also necessary to have information about the characteristics or nature of their involvement in the labor market—whether they are unemployed or employed in science or engineering jobs and what type of work activity (i.e., managerial or nonmanagerial) they are involved in. Observed differences between the experiences of women and minorities and the relevant population can highlight potential areas of concern. These differences can reflect (1) differences in field, work experience, or sector of employment; (2) differences in worker decisions about the nature of their work involvement; (3) differences in employer personnel practices, such as hiring, training, and promotion; or (4) some combination of these factors.

This report examines labor market experiences of scientists and engineers in terms of two employment characteristics: field of employment and career progression/promotion opportunity. The latter characteristic is measured by examining work activities, especially the propensity to be in management, and for those in academia, rank and tenure status.

Information on field of employment is of value for a number of reasons. First, it shows whether women and minorities are underrepresented in some fields relative to men and the majority. Second, it reveals field differences by sex and racial/ethnic group. Since employment opportunities vary by field, field differences can play a significant role in determining differences in such work characteristics as employment in S/E jobs, unemployment, or salaries—characteristics that are frequently used as indicators of labor market experiences. Women and minorities are concentrated in fields with relatively lower salaries, lower rates of S/E employment, and higher rates of unemployment.

Type of work activity can be viewed as an indicator of career development. For those employed in business or industry, management positions can be a measure of promotional treatment; for those employed in academia, rank and tenure status can be indicators of career progression.

The data in this chapter and chapter 2 are based largely on the NSF *Scientific and Technical Personnel Data System* (STPDS), which includes three sample surveys. The first sample consists of scientists and engineers in the labor force at the time of the 1970 Census of Population (Experienced Sample Survey). The second consists of recent S/E graduates from U.S. colleges and universities (New Entrants Survey). The third consists of scientists and engineers holding doctorates (Survey of Doctorate Recipients). Where feasible, information from these three major surveys are aggregated to produce overall national totals for scientists and engineers and for the characteristics of their employment.

The experience of recent S/E graduates can be a sensitive barometer of changing patterns of labor market behavior. Any changes in employer decisions normally are reflected first in employer hiring actions. In addition, since recent graduates constitute the major source of new supply for the S/E labor market, their experiences are a leading indicator of future changes in the characteristics of employed scientists and engineers. Therefore, information pertaining to recent graduates is included wherever appropriate and available.

WOMEN IN SCIENCE AND ENGINEERING

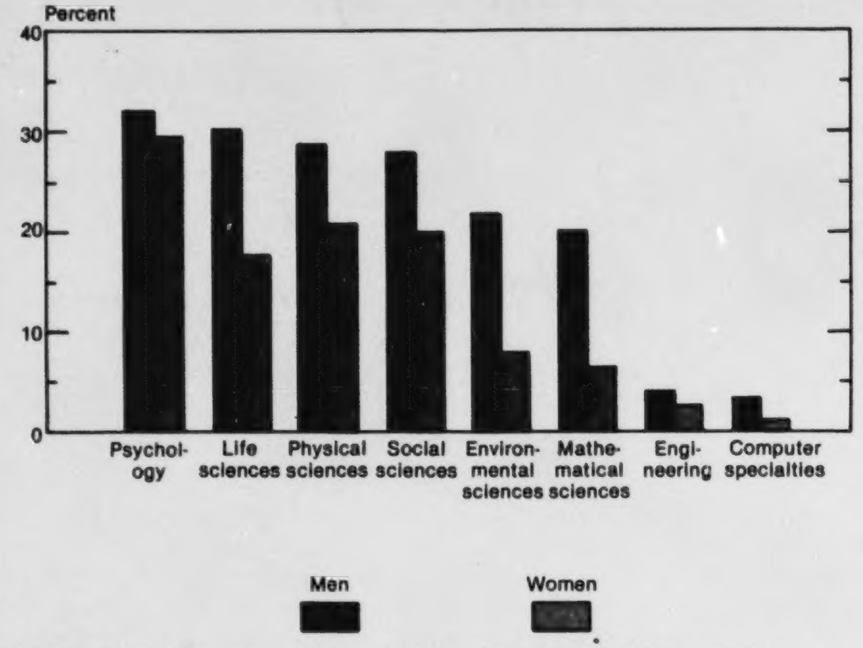
Employment Levels and Trends

Women are underrepresented in science and engineering. In 1978, women represented about 43 percent of all professional and related workers[1], but only 9.4 percent of all employed scientists and engineers, up from 7.8 percent in 1974. Between 1974 and 1978, employment of women scientists and engineers at all degree levels increased from 176,000 to 232,000—almost four times as fast as employment of men (almost 32 percent vs. 8 percent). This trend has accelerated over the more recent past. Between 1976 and 1978, employment of women increased by 17 percent (from 197,000), while employment of men grew by about 3 percent (from 2,180,000 to 2,242,000).

Women scientists have, on average, a lower level of educational attainment than men scientists. Among all women scientists, 15 percent hold doctorates; for men, the comparable figure is 23 percent. Differences between the sexes in level of attainment vary significantly by field (figure 1-1), with the largest female-male differences in mathematical, environmental, and life sciences. Among engineers, about 4 percent of the men and 2.5 percent of the women hold doctorates.

Among doctoral scientists and engineers, employment of women has been increasing almost twice as rapidly as employment of men during the 6-year period ending in 1979. Between 1973 and 1979, employment of women doctoral scientists and engineers almost doubled (from 17,000 to over 33,000—a 97 percent increase), while employment of men increased by only about 38 percent (from 204,000 to 280,000). The 33,000 employed women doctoral scientists and engineers in 1979 represented about

Figure 1-1. Proportion of employed scientists and engineers with doctorates by field and sex



Note: Based on 1979 data for doctorate scientists and engineers, 1978 data for all scientists and engineers.

SOURCES: Appendix tables 6a and 9a

11 percent of all doctoral scientists and engineers, up from 7.7 percent in 1973.

Field

Women are concentrated in different fields[2] of science and engineering than men. In 1978, women represented about one-fifth of employed social, life, and mathematical scientists and about one-sixth of all employed computer specialists. Less than 2 percent of all engineers were women (figure 1-2).

Figure 1-3 shows the field distribution of employed female and male scientists and engineers. An "index of dissimilarity" (a summary measure of overall differences between two distributions) can be used to quantify the field differences between two groups.[3] Among male and female scientists and engineers, the 1978 index of dissimilarity was 52. This figure means that 52 percent of the women would have to change fields or occupations to have a distribution identical to that of men.

There have been changes in the field distribution of employed female scientists and engineers over time, most notably in engineering and the social sciences. In 1976, less than 4 percent of the women were engineers; by 1978, this proportion had increased to almost 9 percent, and women as a proportion of all engineers increased from 0.5 to 1.6 percent. Conversely, the proportion of women who were social scientists declined from 23 to 16 percent between 1976 and 1978, and the proportion of social scientists who were women declined from 23 to 20 percent (appendix table 4).

A different picture develops if engineers (primarily a male occupation) are eliminated from the analysis (figure 1-4). Differences narrow, and the index falls from 52 to 16. But men are more heavily concentrated in the physical sciences, and women are still more likely to be life and social scientists or psychologists. Although the relatively small number of women engineers and physical scientists is striking, women are now earning an increasing proportion of degrees in these fields (see chapter 3).

Women scientists and engineers holding doctorates are concentrated in the life and social sciences and psychology. Men are most likely to be life or physical scientists and engineers (figure 1-5). Among women, the fastest growing employment fields at the doctoral level were engineering, where employment of women increased from 100 in 1973 to 500 in 1979, and computer specialties, where the increase was from 100 to 400. For men, the fastest growing fields were computer specialties, social sciences, and psychology. Between 1973 and 1979, field differences between women and men at the doctoral level narrowed.

Despite rapid increases in employment, less than 3 percent of women holding doctorates were engineers or computer specialists in 1979. Almost 85 percent of the growth in employment of women doctoral scientists and engineers took place in three major fields—life sciences, social sciences, and psychology. Over the 1973-79 period, the proportion of women holding doctorates in these three major fields has remained relatively constant (figure 1-5).

The differences between sexes in field distribution for doctoral scientists and engineers were smaller than those found in the total S/E work force. In 1979, the index of dissimilarity for doctoral scientists and engineers was 38, compared with 52 for scientists and engineers at all degree levels. For doctoral scientists, the index was 30, compared with 16 for those at all degree levels.

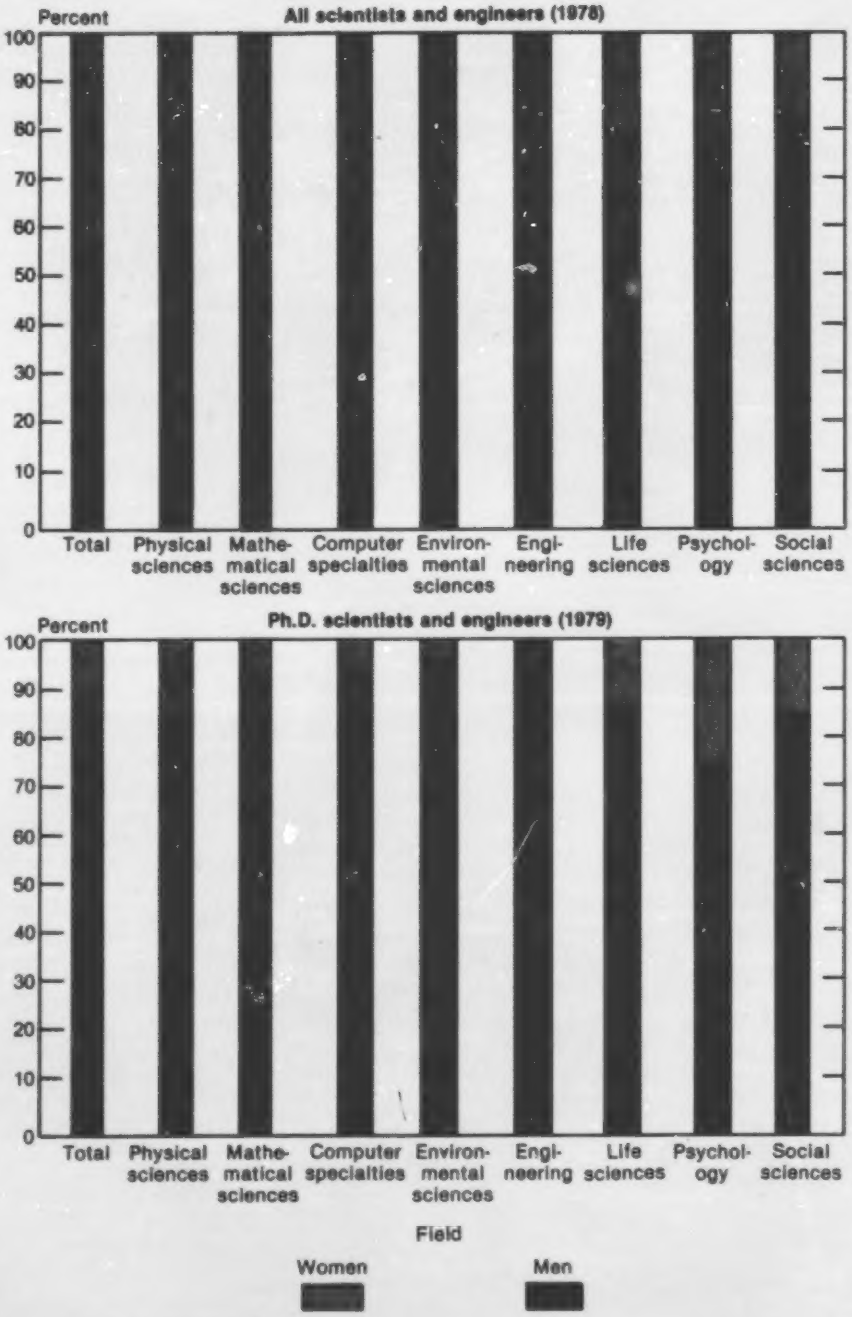
Work Activities and Sector of Employment

Some work activities can be viewed as indicators of career development or progression. The number and proportion of women in business and industry primarily engaged in management activities are a rough proxy for one type of "promotional opportunity." Likewise, for those in academia, faculty and tenure status can be indicators of career progression.

Roughly equal proportions of women and men cite research and development (R&D) as their primary work activity, with women (primarily scientists) more likely than men (primarily engineers) to cite research rather than development. Next to R&D, the most frequently reported activity for men is management; for women, it is a combination of report writing, statistical work, and computing activities (figure 1-6).

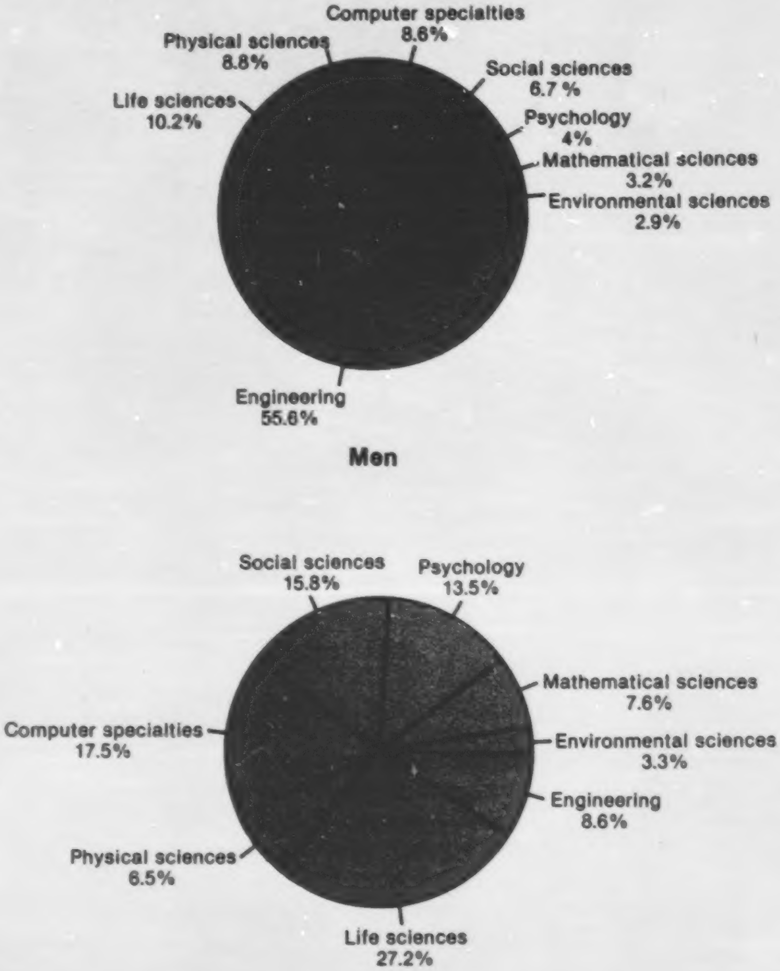
The proportion of men in 1978 reporting management as their primary work activity was more than twice that of women (27 percent vs. 12 percent). Although the numbers of both women and men in management have increased since 1974, the proportions have remained constant.

Figure 1-2. Employed scientists and engineers by sex and field



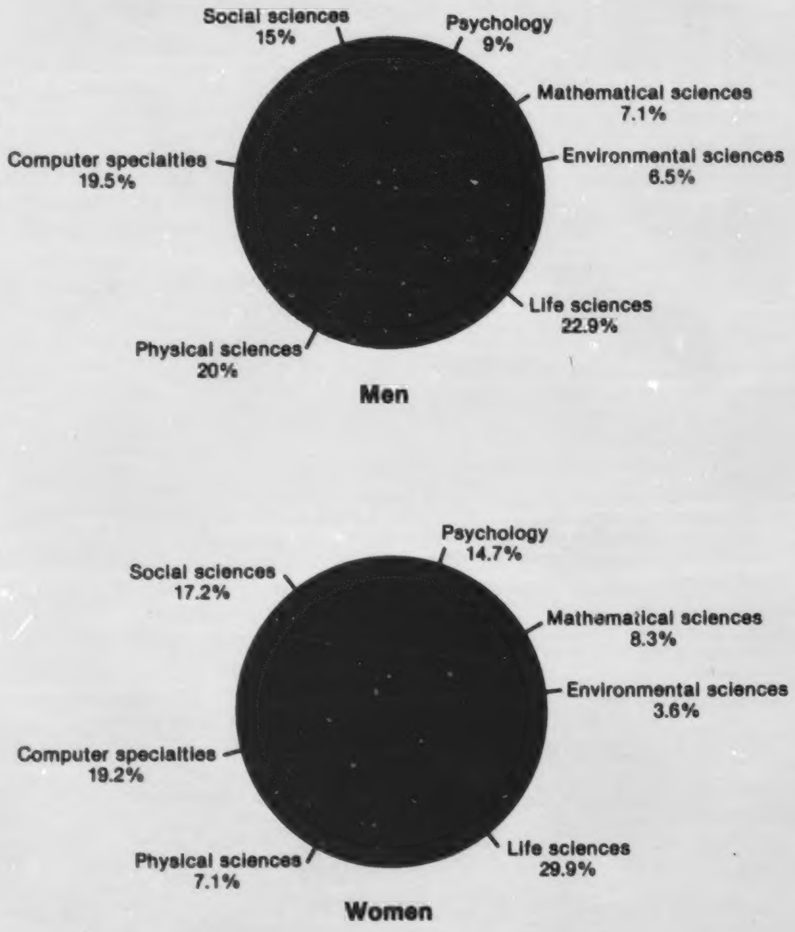
SOURCES: Based on appendix tables 8a and 9b

Figure 1-3. Distribution of employed scientists and engineers by sex and field: 1978



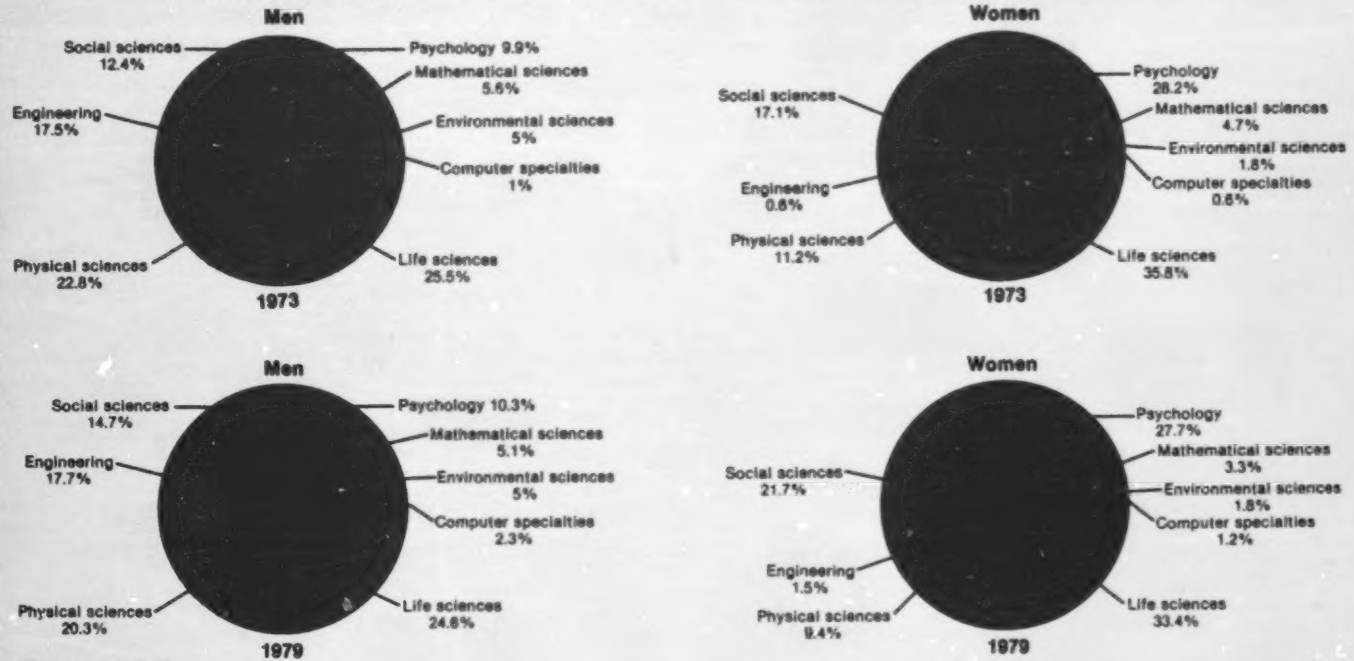
SOURCE: Appendix table 6a

Figure 1-4. Employed scientists by sex and field: 1978



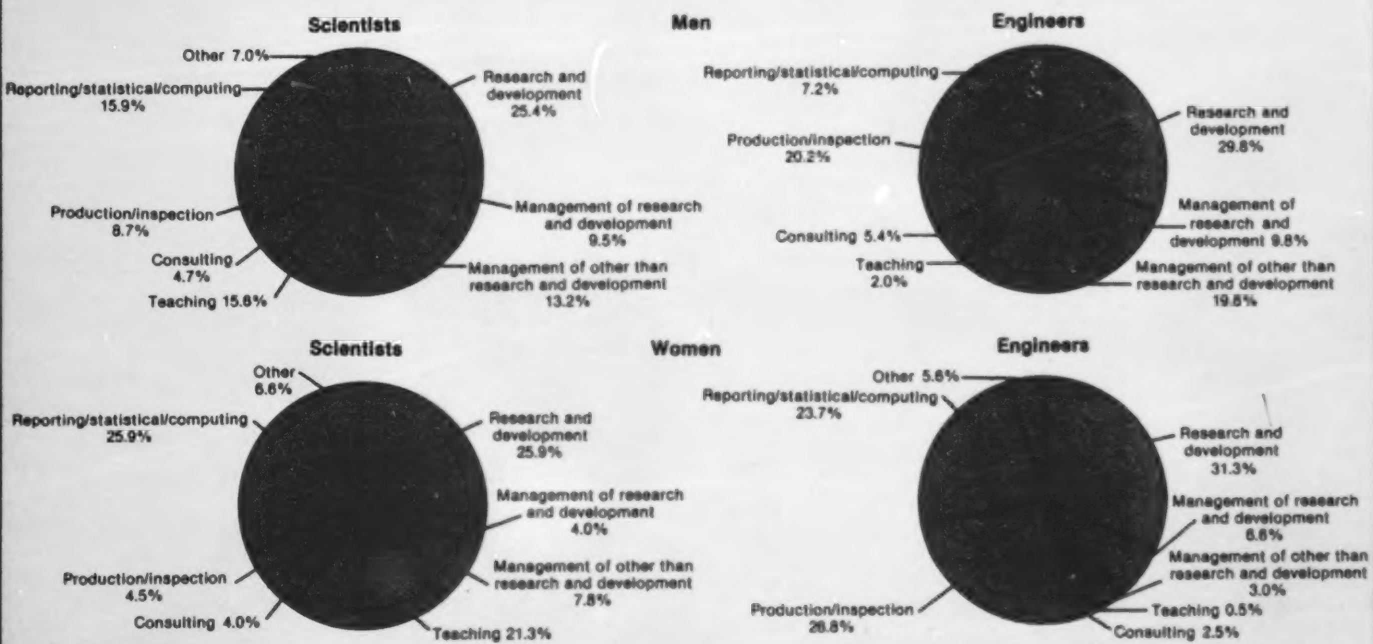
SOURCE: Appendix table 6a

Figure 1-5. Distribution of employed Ph.D. scientists and engineers by sex and field: 1973 and 1979



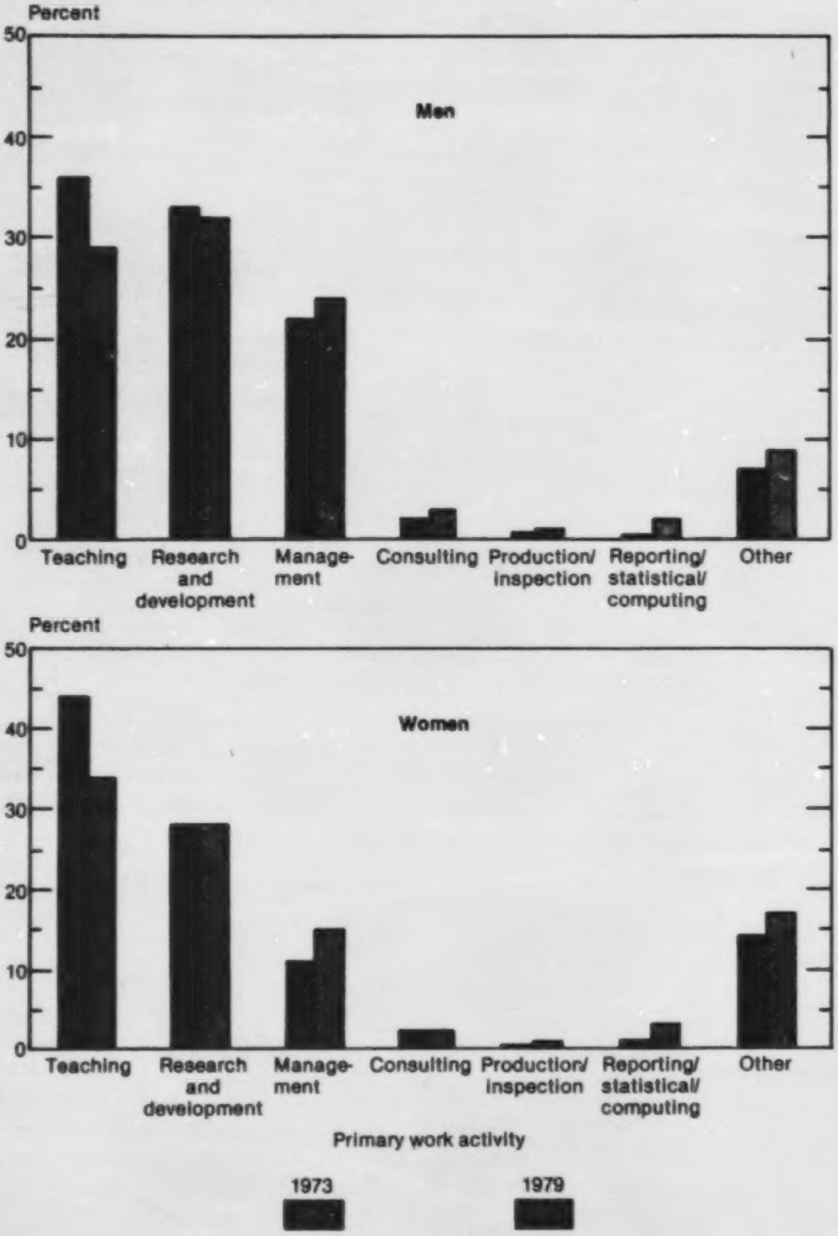
SOURCE: Appendix table 7

Figure 1-6. Employed scientists and engineers by sex and primary work activity: 1978



SOURCE: Appendix table 18

Figure 1-7. Employed Ph.D. scientists and engineers by sex and primary work activity: 1973 and 1979



SOURCE: Appendix table 19

Among men, engineers are more likely than scientists to be in management. Among women, the reverse is true (figure 1-6). These differences partially reflect the younger age of women as compared to men in the S/E work force. In 1978, for example, 70 percent of the women, but only 38 percent of the men, were under 35 years of age.

One way of standardizing for age differences is to examine the work activities of men and women of roughly comparable ages. Among recent (1978 and 1979) S/E graduates at both the bachelor's and master's levels, the proportions of women and men in management activities are nearly equal. In 1980, about 13 percent of recent graduates of both sexes at the bachelor's level reported management as their primary activity; at the master's level, the figures were 12 percent for men and 10 percent for women.

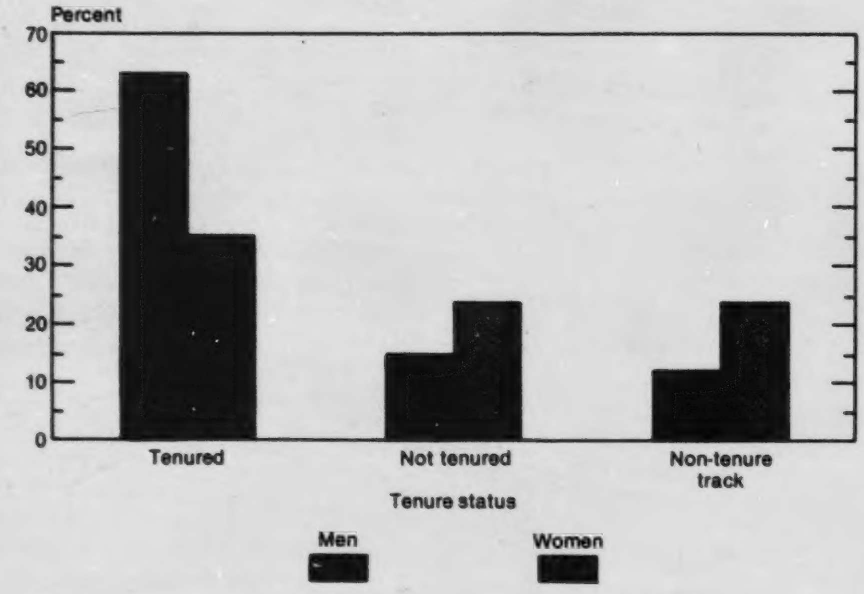
Work activities of both women and men doctoral scientists and engineers have shifted over time (figure 1-7). For both sexes, the proportion reporting teaching has declined, while the proportion reporting management has increased. These trends reflect, in part, a sectoral shift in job opportunities from educational institutions to business and industry, which, in turn, reflects the slower rate of growth in the age of the population group likely to enroll in institutions of higher education. One way to control for this shift is to focus on the academic sector.

Within educational institutions, a smaller fraction of women doctoral scientists and engineers hold tenure or are in tenure-track positions. In 1979, 35 percent of the women held tenure, and an additional 34 percent were in tenure-track positions; among men, 63 percent held tenure, and an additional 15 percent were in tenure-track positions (figure 1-8). A smaller fraction of women held full or associate professorships. In 1979, almost 75 percent of the men, but only 47 percent of the women, were full or associate professors. Most of this difference was at the full professor rather than the associate professor level.[4]

A recent study supported by NSF showed that sex differences in rank and tenure status persist even when samples are matched for field and years since receipt of doctorate. Among those receiving their doctorates between 1970 and 1974, one-third of the women and one-half of the men held senior faculty posts. In every field, there was a greater concentration of women among assistant professor and nonfaculty appointees.[5]

Sector of employment affects a number of employment characteristics, including salaries and work activities. Women are less likely than men to work in business and industry and more likely to be employed by educational institutions and government agencies (primarily State and local). In 1978, about 36 percent of women scientists and engineers, compared to almost 65 percent of men, were in business and industry (figure 1-9). The participation of women in business and industry, however, is changing. Among recent bachelor's recipients in science and engineering, about one-half of

Figure 1-8. Ph.D. scientists and engineers in educational institutions by tenure status and sex: 1979



SOURCE: National Science Foundation, unpublished data

the women and 70 percent of the men were in business and industry.

The higher proportion of men scientists and engineers in business and industry results largely from the concentration of engineers in industry. In 1978, over two-thirds of the men in this sector were engineers, and most engineers (80 percent) worked in business and industry. If engineers are excluded, the differences in employment sector between women and men narrow (figure 1-10). The remaining difference is partly a result of the different fields of science in which women and men are employed. For example, more men than women are physical scientists, and more physical scientists work in industry than in other sectors. With the exception of mathematical and environmental scientists, however, men are more likely than women to work in business and industry—regardless of field of science.

The largest proportion of both male and female doctoral scientists and engineers found employment in educational institutions. There is a disparity, however, in the sectoral distributions of doctoral women and men (figure 1-11). A larger proportion of the women than men are employed by educational institutions, and a smaller proportion are employed in business and industry. In 1979, two-thirds of the women were in educational institutions, as compared to somewhat more than one-half of the men. Within universities, women were less likely than men to be in research-oriented institutions. A study by the National Academy of Sciences found that almost 26 percent of doctoral men but only 21 percent of the women were in the top 50 institutions, (as measured by R&D expenditures).[6] Within educational institutions a larger proportion of the women were in 2-year colleges and elementary and secondary schools (8 percent of the women vs. 3.4 percent of the men). The proportion of women employed by business and industry was half that of men.

Business and industry was the fastest growing employment sector for doctoral scientists and engineers of both sexes over the 6-year period ending in 1979. Women at the doctoral level have been increasing their share of industrial employment. Between 1973 and 1979, employment of women doctoral scientists and engineers in business and industry increased at a much faster rate (from 1,400 to 4,600, or 22 percent per year) than for men (from 52,000 to 78,000, or 7 percent per year) (appendix table 26).

MINORITY WOMEN IN SCIENCE AND ENGINEERING

Employment Levels and Trends

Among scientists and engineers, minority women were more highly represented than minority men. For example, among men scientists and engineers in 1978, 96 percent were white, about 1 percent were black, and about 2 percent were Asian (text table 1-1). In 1978, about 91 percent of women scientists and engineers were white, 5 percent (13,800) were black, and almost 3 percent (7,800) were Asian. The remaining men and women (less than 1 percent) were members of other racial groups or did not report their racial status.

Table 1-1. Scientists and engineers by race and sex: 1978 (percent)

Race		Men	Women
White	100.0	90.8	9.2
Black	100.0	67.0	33.0
Asian	100.0	85.5	14.5
White	---	96.1	91.0
Black	---	1.1	5.2
Asian	---	1.8	2.9
Other	---	0.9	0.9
Total		100.0	100.0

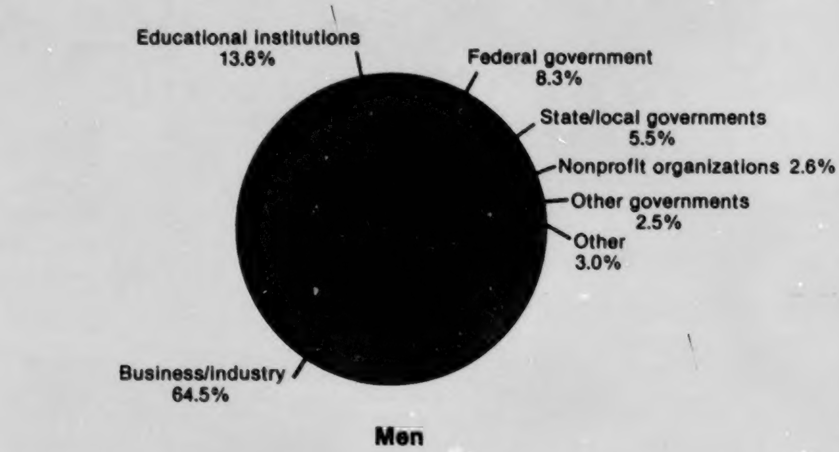
Note: Detail may not add to total due to rounding.

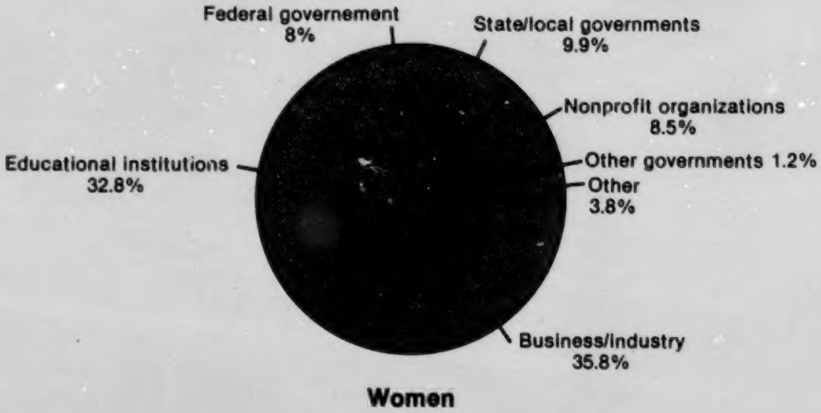
Source: Appendix tables 3b and 15.

Among employed doctoral women scientists and engineers, relatively few were members of racial minority groups. However, for some groups, the proportion of minority women was higher than the proportion of minority men. Black women made up a larger share of all S/E doctoral women than did black men of all S/E doctoral men. Black women represented 2.4 percent (785) of all employed doctoral women, while black men represented only 1 percent of employed doctoral men. Among Asians, the proportions for men and women were similar: Asian women made up 6 percent (2,030) of all employed doctoral women, and Asian men made up 7 percent of all employed doctoral men. Less than one-half of 1 percent (117) of employed doctoral women scientists and engineers were native Americans.

Since the early seventies, employment of minority women doctoral scientists and engineers increased more rapidly than employment for similar white women. Between 1973 and 1979, employment of white women increased by 90 percent (from

Figure 1-9. Employed scientists and engineers by sex and type of employer: 1978





SOURCE: Appendix table 25

15,400 to 29,300), while employment of minority women increased by over 200 percent, albeit from very small bases—from 255 to 785 for blacks, from 640 to 2,030 for Asians, and from 34 to 117 for native Americans.

Field

The field distribution of women scientists and engineers varies considerably by race (text table 1-2). For example, 54 percent of black women, 12 percent of Asian women, and 14 percent of white women were social scientists.

Text table 1-2 also shows the field distribution of employed black and Asian women doctoral scientists and engineers. The field distribution of black women resembles that of all women at the doctoral level: roughly one-third of the black women were life scientists, about 30 percent were psychologists, and 28 percent were social scientists. Asian women (85 percent of whom were foreign born) show a field distribution different from that of non-Asian women. They were, for example, more highly represented among physical scientists.

RACIAL MINORITIES IN SCIENCE AND ENGINEERING

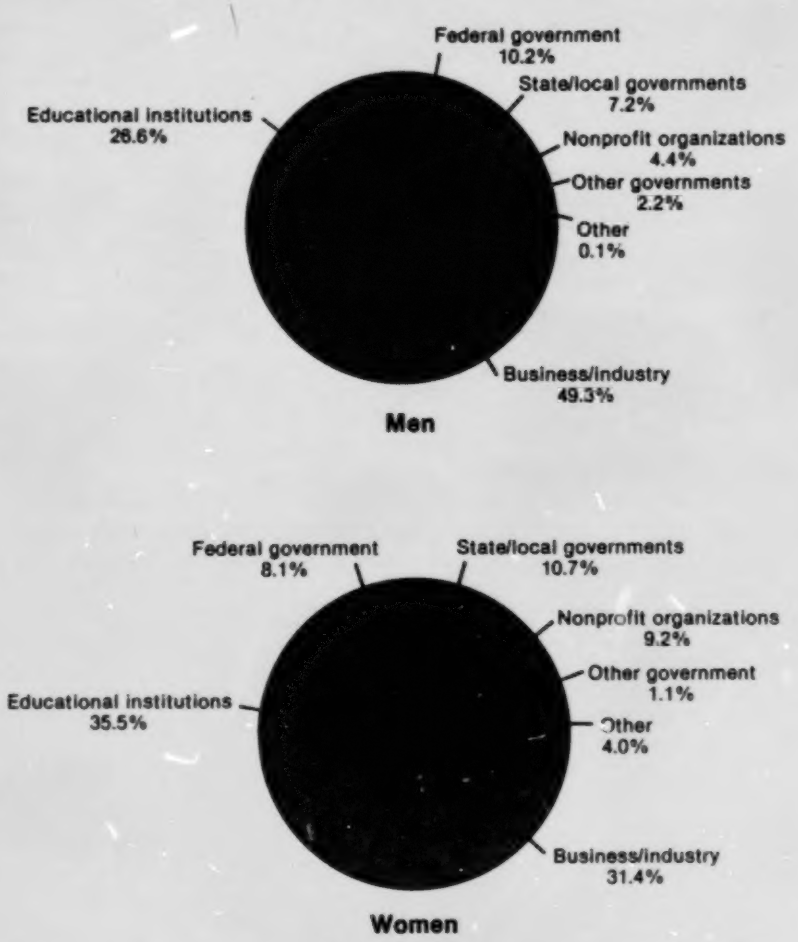
Any analysis of minorities in science and engineering should distinguish, whenever possible, between blacks, Asians, and other minorities, as these groups differ in terms of representation among scientists and engineers, representation in the general population, and employment characteristics. Among employed scientists and engineers in 1978, 3.6 percent (90,000) were members of racial minority groups. Of these minorities, 56 percent were of Asian extraction, and 44 percent were black.

It should be noted that, in 1979, slightly over one-half of the doctoral level Asian scientists and engineers were non-U.S. citizens, and of those who were U.S. citizens, over 80 percent were foreign born. Thus, 91 percent of the Asian doctoral scientists and engineers in 1979 were foreign born, although roughly 40 percent of these were U.S. citizens. In contrast, among black doctoral scientists and engineers, about 2 percent were foreign born, and among whites, about 10 percent were foreign born.

Employment Levels and Trends

During the mid- to late-1970's, employment of black and Asian scientists and

Figure 1-10. Employed scientists by sex and type of employer: 1978



Men

Women

SOURCE: Appendix table 25

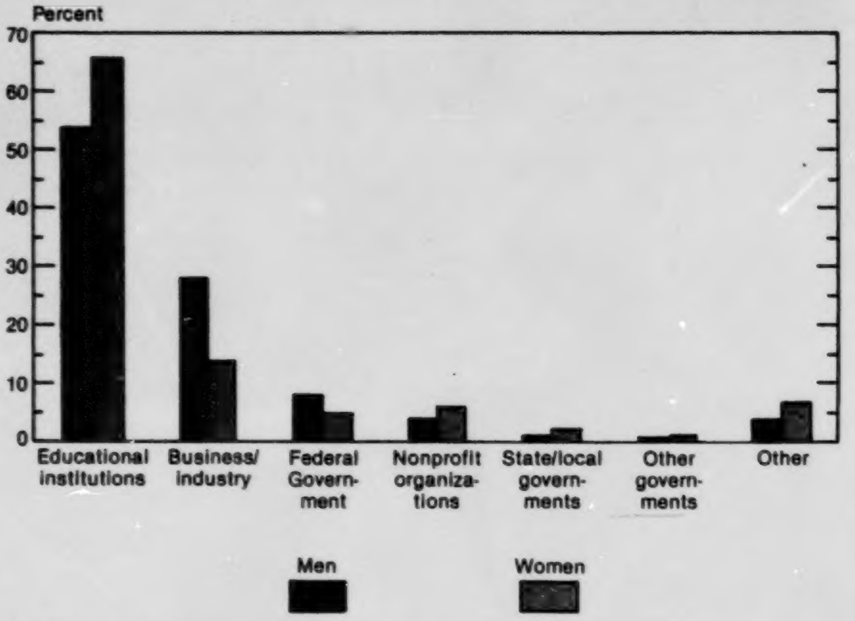
Table 1-2. Women scientists and engineers by field and race (percent)

Field	S/E population (1978)			Employed doctoral S/E's (1979)		
	White	Black	Asian	White	Black	Asian
Physical sciences	13.8	2.9	12.8	8.6	5.7	23.7
Mathematical sciences	7.5	7.2	---	3.3	1.4	4.9
Computer specialties	16.4	0.7	35.9	1.0	1.0	2.8
Environmental sciences	3.3	2.9	2.6	1.9	0.5	1.7
Engineering	8.3	6.5	7.7	1.4	0.6	4.6
Life sciences	28.1	8.7	29.5	33.0	33.4	44.6
Psychology	13.8	17.4	---	28.7	29.6	7.3
Social sciences	14.0	54.3	11.5	22.1	27.8	10.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Detail may not add to total due to rounding.

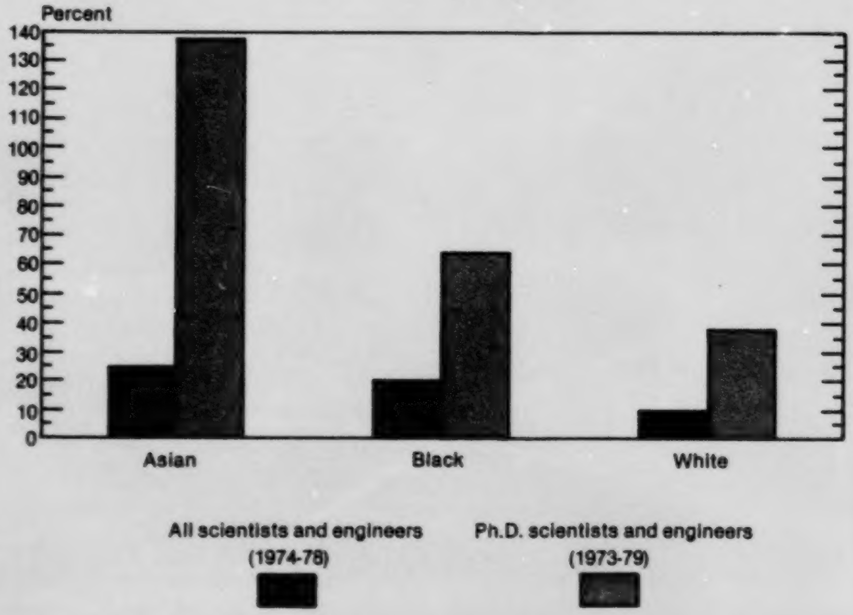
Source: Appendix tables 13 and 15.

Figure 1-11. Employed Ph.D. scientists and engineers by sex and type of employer: 1979



SOURCE: Appendix table 27

Figure 1-12. Percent increase in employment of scientists and engineers by race



SOURCES: Appendix tables 5 and 8

engineers at all educational levels increased at a much faster rate than employment of whites (figure 1-12). Between 1974 and 1978, employment of black scientists and engineers grew 20 percent (from 32,500 to 39,000)—twice as fast as employment of whites, which grew only 10 percent (from 2,153,000 to 2,361,000). Employment of Asians increased even more rapidly (25 percent, from 40,300 to 50,500). This faster growth in minority employment, however, did not significantly alter the overall representation of minorities among scientists and engineers. Asians and blacks represented 2.0 percent and 1.6 percent, respectively, of employed scientists and engineers in 1978, up from 1.8 percent and 1.4 percent in 1974.

Blacks are clearly underrepresented in science and engineering jobs. Asians, who make up a smaller percentage of the population, are not. In 1978, blacks and other minorities represented almost 9 percent of all professional and related workers.[7] Of these minorities in professional and related jobs, over three-fourths were black. Thus, blacks represented 7 percent of those in all professional and related jobs, but less than 2 percent of the S/E work force.

In 1979, Asians had a higher level of educational attainment than their white or black colleagues. Among all Asian scientists and engineers, about two-fifths held doctorates. Most (about 90 percent), however, were foreign born. In contrast, between 9 percent and 12 percent of both black and white scientists and engineers held doctorates.

Employment of both black and Asian scientists and engineers with doctorates has increased more rapidly than employment of whites. Between 1973 and 1979, Asian employment more than doubled (from 9,100 to 21,000); among blacks, employment increased by almost two-thirds (from 2,100 to 3,400); among whites, employment increased by 38 percent (from 200,000 to 277,000) (appendix table 8). Despite this rapid growth, the 3,400 blacks employed in 1979 represented only 1 percent of all employed doctoral scientists and engineers, up slightly from 1973. The 21,000 employed Asian scientists and engineers represented almost 7 percent of the total, up significantly from about 4 percent in 1973. Between 1973 and 1979, the employment of native Americans increased from 390 to 925. The 925 native American doctoral scientists and engineers employed in 1979 represented 0.3 percent of the total.

Field

Data for 1978 show black, Asian, and white scientists and engineers concentrated in different fields of science and engineering (figure 1-13). Blacks were more likely than whites to be scientists than engineers; over half of the whites but only 27 percent of the blacks were engineers, and blacks represented less than 1 percent of all engineers (figure 1-14). In science, blacks were more likely than whites to be social scientists or psychologists; 37 percent of the blacks were social scientists and almost 12 percent were psychologists. For whites, the comparable figures were 15 and 10 percent.

The field distribution of Asian scientists and engineers is similar to that for whites (figure 1-13). Over half of both whites and Asians were engineers rather than scientists.

The index of dissimilarity can be used to summarize overall field differences among racial groups.[8] The index of dissimilarity between whites and blacks at all degree levels in 1978 was 38. This figure means that roughly 38 percent of the blacks would have to change fields or occupations to have a distribution identical to that for whites. The index of dissimilarity between Asians and whites was 13.

Regardless of race, about one-fourth of S/E doctorates in 1979 were life scientists (text table 1-3). This was the only field for which such similarity existed. The various

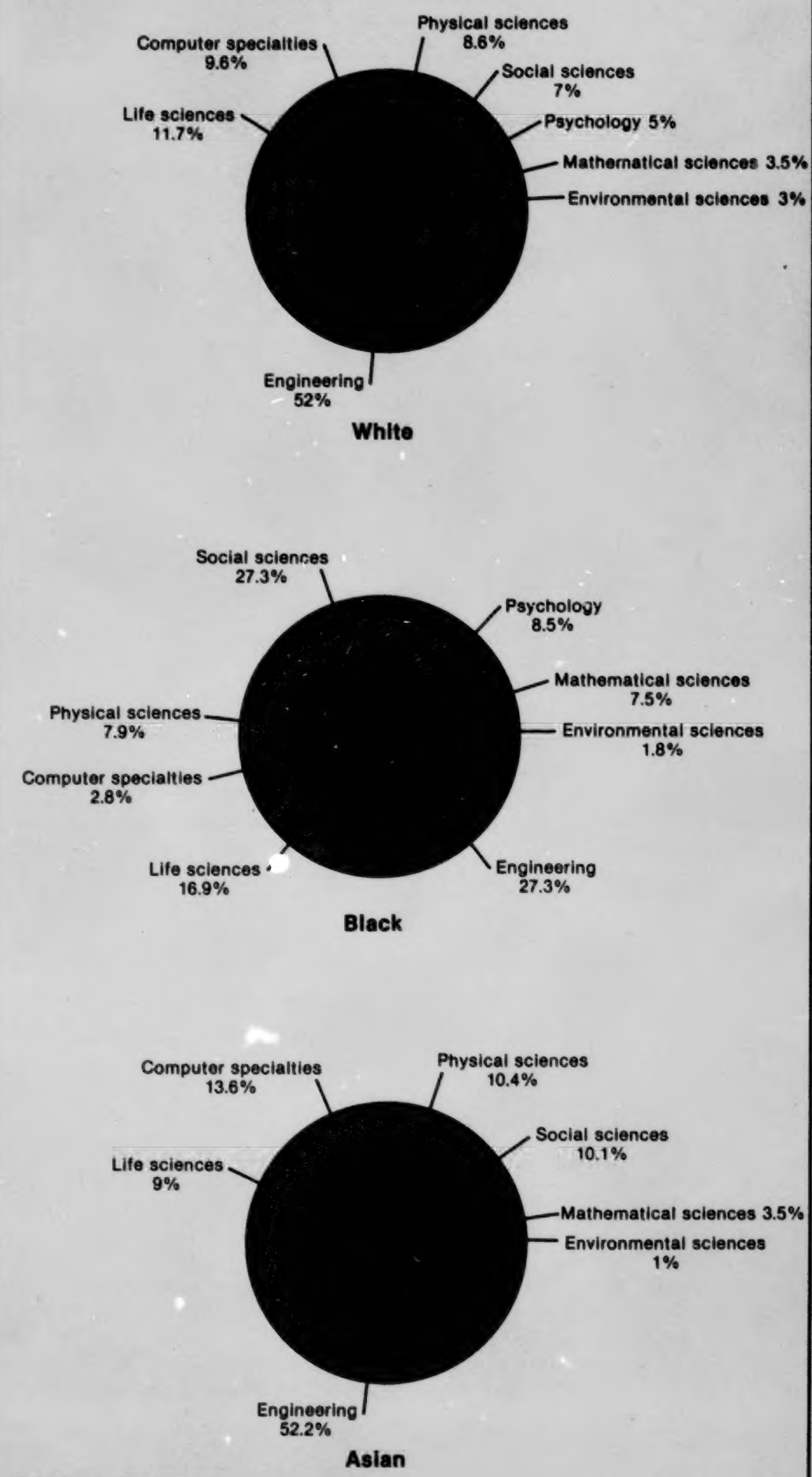
Table 1-3. Employed doctoral scientists and engineers by field and race: 1979 (percent)

Field	White	Black	Asian	Native American
Physical sciences	19.2	14.8	20.7	17.3
Mathematical sciences	4.8	4.5	4.5	5.6
Computer specialties...	1.0	0.2	2.2	2.4
Environmental sciences	4.9	1.9	2.3	3.0
Engineering ...	14.8	5.4	35.6	7.1
Life sciences ..	25.7	27.1	23.1	23.8
Psychology	12.7	17.5	1.9	23.3
Social sciences	15.7	28.5	9.7	17.5
Total	100.0	100.0	100.0	100.0

Note: Detail may not add to total due to rounding.

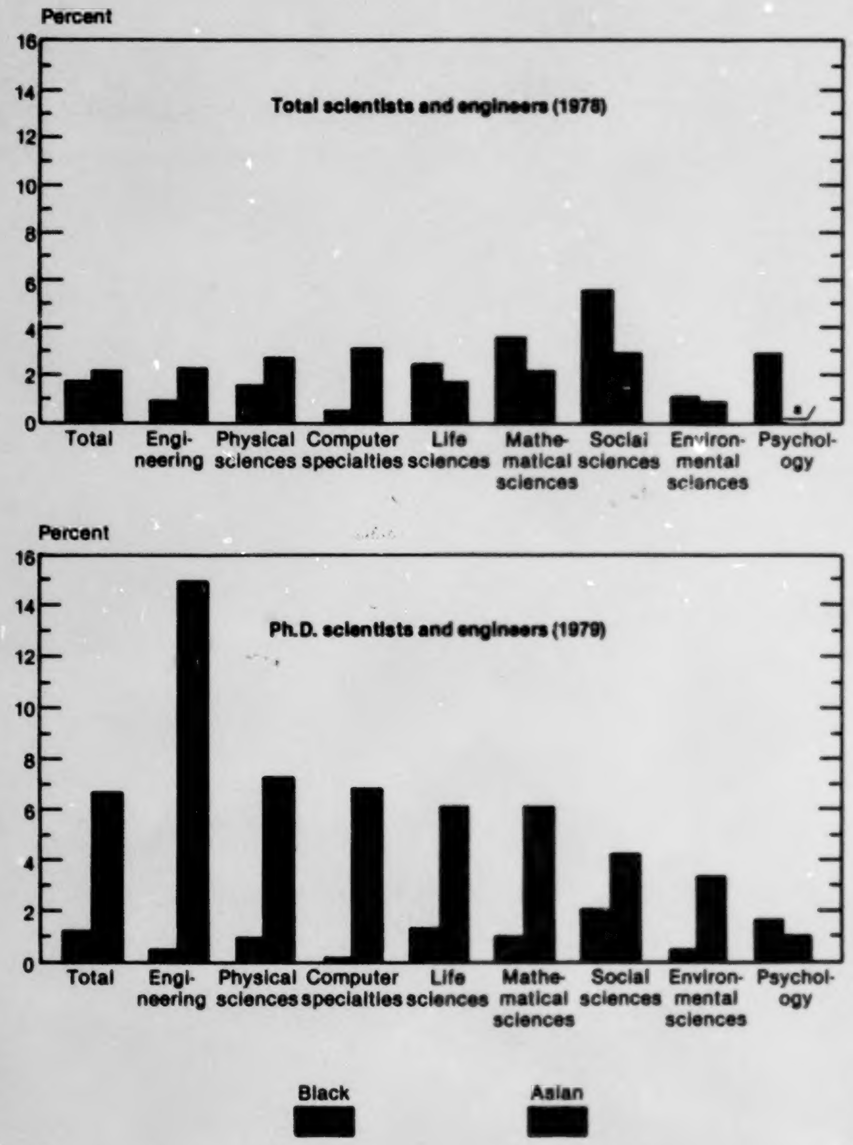
Source: Appendix table 9b and unpublished data.

Figure 1-13. Employed scientists and engineers by race and field: 1978



SOURCE: Appendix table 8b

Figure 1-14. Racial minorities as a percent of all employed scientists and engineers by field



*Too few cases to estimate.

SOURCES: Appendix tables 6b and 9b

racial groups were distributed quite differently between engineering and science and across fields of science. A larger proportion of blacks and native Americans were social scientsts and psychologists, while a larger share of the Asians were engineers and physical scientists. At the doctoral level, the index of dissimilarity between blacks and whites in 1979 was 20; between Asians and whites, it was 26.

The relatively high proportion of women among black doctoral scientists and engineers (23 percent in 1979) does not appear to affect the field distribution of blacks. Although black men were more likely than black women to be physical, mathematical, and environmental scientists and engineers, over 70 percent of the black male doctoral scientists and engineers were still in the life and social sciences and psychology. Among whites, 54 percent were in these fields.

The proportions of both blacks and whites in the social sciences and psychology increased between 1973 and 1979. For example, the proportion of blacks who were social scientists increased from 18 percent in 1973 to 28 percent in 1979, when blacks represented 2 percent of all social scientists. Over the same period, the proportion of whites increased from 13 to 16 percent. Among Asians, the field distribution showed relatively little change between 1973 and 1979. Slight proportional declines were noted for most science fields, while proportional increases were noted for engineering and computer specialties. In 1979, Asians represented 15 percent of all doctoral level engineers and 7 percent of all doctoral physical scientists (figure 1-14).

Among native American doctoral scientists and engineers in 1979, almost 24 percent were life scientists, 24 percent were psychologists, 17 percent were physical scientists, and 18 percent were social scientists (text table 1-3).

Work Activities and Sector of Employment

Data on work activities by race are not available for all scientists and engineers. However, some identification of differences in work activities by race can be gained by examining the activities of experienced scientists and engineers (those in the labor force at the time of the 1970 Census of the Population), recent graduates, and doctoral scientists and engineers.

Among experienced scientists and engineers, 30 percent of both blacks and whites were likely to work in some aspect of management (appendix table 23). Asians, however, did not participate in management to the same extent as their white or black colleagues; only 19 percent held management positions.

Among recent graduates at the bachelor's level, however, the findings have been mixed. Whites more often reported management as their primary work activity than blacks or Asians (13 percent vs. 9 percent). Among recent master's degree holders, blacks were more likely than whites or Asians to be in management (17 percent, 12 percent, and 6 percent, respectively).

Work activities of doctoral scientists and engineers have shifted over time. For all races, the proportions citing teaching as their primary activity have declined, while the proportions reporting management have increased. The most significant proportional gains in management were reported by

Asians, from 12 percent in 1973 to 24 percent in 1979. For whites, the proportion in management remained stable at around 23 percent; for blacks, the increase was from 24 to 28 percent. In part, these changes reflect sectoral shifts in employment opportunities from educational institutions to business and industry.

Within educational institutions, however, whites were more likely than blacks or Hispanics to be tenured.[9] Of those who received their doctorates in science and engineering between 1960 and 1978 and who were academically employed in 1979, about 62 percent of the whites, 47 percent of the blacks, and 64 percent of the Asians were tenured. Blacks were less likely than whites or Asians to hold full professorships. Of those who earned their degrees between 1960 and 1978, 28 percent of the whites and Asians were at this rank in 1979 compared to 19 percent of the blacks. It is interesting to note that most (90 percent) of the Asians holding full professorships were foreign born. Much smaller percentages of whites (13 percent) and blacks (27 percent) were foreign born.

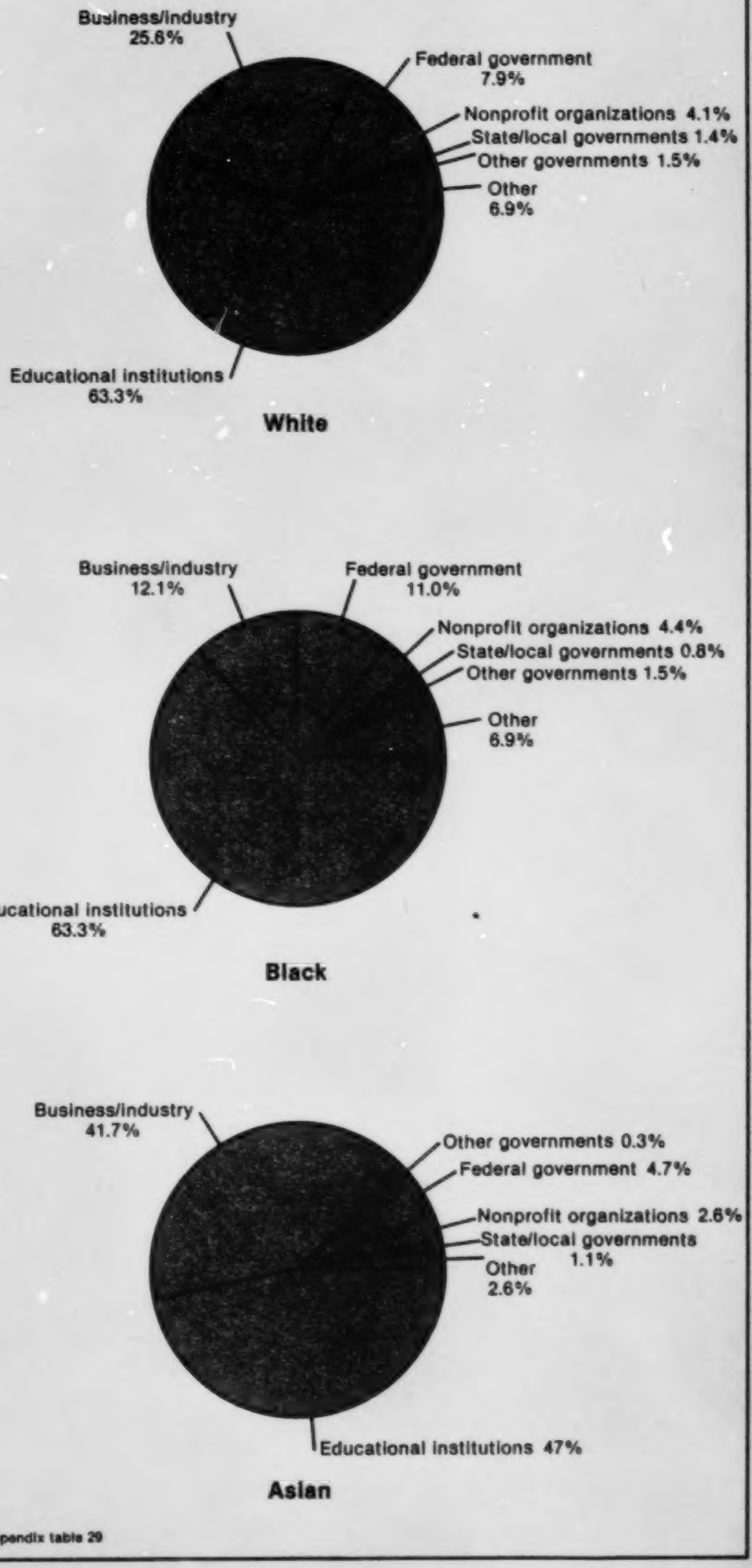
Sector of employment affects a number of employment characteristics, including work activities and salaries. Reliable data are not available by race for all scientists and engineers. Data by race, however, are available for some segments of the S/E work force.

Among experienced scientists and engineers in 1978, almost two-thirds of the whites, one-third of the blacks, and over half of the Asians were in business and industry. Among recent graduates at both the bachelor's and master's levels, Asians were more likely than whites and whites were more likely than blacks to be in business and industry.

Most doctoral scientists and engineers were in educational institutions in 1979, although the proportion in educational institutions has been declining for all races since the early 1970's. Blacks, however, are still more likely than whites or Asians to be in educational institutions. Over two-fifths of the Asians and over one-quarter of the whites were in business and industry in 1979. Among blacks, only 12 percent were in this sector (figure 1-15).

Between 1973 and 1979, employment of Asian doctoral scientists and engineers in business and industry more than tripled, while employment of blacks was up one-

Figure 1-15. Employed Ph.D. scientists and engineers by race and type of employer: 1979



SOURCE: Appendix table 29

REFERENCES

1. U.S. Department of Labor, *Employment and Training Report of the President, 1979*, p. 261.

2. See Technical Notes for definitions of the fields of science and engineering as well as methods used to classify persons as scientists and engineers.

3. U.S. Commission on Civil Rights, *Social Indicators of Equality for Minorities and Women*, Washington, August 1978, p. 39. "The index... represents the percentage of a group who would have to change occupations in order for the group to have the identical occupational distributions of a comparison group. If two groups had the same distributions of occupations, the index of dissimilarity would be 0.0...." (p. 44).

4. For a complete discussion of women in academe, see National Academy of Sciences, *Climbing the Academic Ladder: Doctoral Women Scientists in Academe*, Washington, 1979.

5. See Commission on Human Resources, "Career Outcomes In a Matched Sample of Men and Women Ph.D.'s: An Analytical Report," Washington, National Research Council, National Academy of Sciences, 1981.

6. *Climbing the Academic Ladder*, table 4.3, p. 60.

7. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 26, No. 1, Washington, 1979, p. 172.

8. *Social Indicators of Equality for Minorities and Women*, p. 39.

9. Data on tenure and rank are from the National Research Council, *Employment of Minority Ph.D.'s: Changes Over Time*, Washington, National Academy of Sciences, 1981, pp. 31 and 32.

10. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 27, No. 1, Washington, 1980, pp. 191-193.

11. *Employment of Minority Ph.D.'s*, pp. 31-32.

third, and white employment was up 45 percent.

The relatively high proportion of whites and Asians in business and industry results from the concentration of engineers in industry. Whites and Asians are much more likely than blacks to be engineers rather than scientists (text table 1-3).

Over 70 percent of the blacks are in those fields of science—social science, life science, and psychology—where employment opportunities are concentrated in the academic sector.

HISPANIC SCIENTISTS AND ENGINEERS

Statistical information on the participation of Hispanics in science and engineering is limited because of small sample sizes and high levels of nonresponse to questions relating to Hispanic status. For example, in the NSF-sponsored 1979 Survey of Doctorate Recipients, less than 1 percent of the respondents reported they were Hispanic, while 18 percent did not answer the question.

Employment Level

Hispanics are a diverse ethnic group, and as the socioeconomic backgrounds and reasons for underrepresentation may differ among these groups, it is desirable to distinguish between Mexican-Americans, Puerto Ricans, and other Hispanics. Unfortunately, because of data constraints, this report has had to treat Hispanics as an aggregate, and discussion must be limited to Hispanic scientists and engineers holding doctorates.

Persons of Hispanic origin are underrepresented among the doctoral S/E population. Although almost 5 percent of all employed persons 25 years of age or older claim Hispanic origins, and over 2 percent of all professional and related workers were Hispanic in 1979, Hispanics make up less than 1 percent of doctoral scientists and engineers.[10] Among employed Hispanic doctoral scientists and engineers, about 20 percent were not U.S. citizens in 1979, and an additional 16 percent were foreign born although holding U.S. citizenship. Almost 2,600 doctoral scientists and engineers reported Hispanic origins in 1979. Most (2,460) were employed.

By most measures, the employment characteristics of Hispanic scientists and engineers at the doctoral level are similar to those of their non-Hispanic colleagues.

Field

The field distribution for Hispanic scientists and engineers is roughly similar to that for all doctoral scientists and engineers (figure 1-16). Hispanics, however, are somewhat less likely than non-Hispanics to be environmental scientists or engineers.

Sex, Race, Age

About 14 percent of doctoral Hispanic scientists and engineers were women in 1979, a higher percentage than among all doctoral scientists and engineers (about 11 percent) (appendix table 36).

Over one-third of those reporting Hispanic origins did not report their race in 1979; 58 percent reported their race as white.

Hispanic scientists are, on average, younger than their non-Hispanic colleagues. In 1979, about 32 percent of the Hispanics were under 35 years of age, compared to 19 percent of all doctoral scientists and engineers.

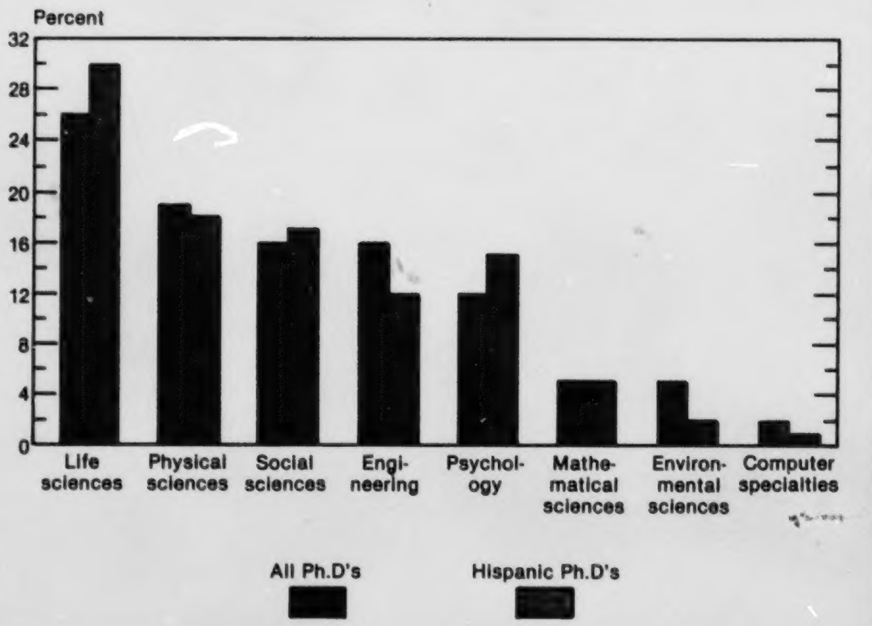
Work Activities and Sector of Employment

Work activities of Hispanic and non-Hispanic doctoral scientists and engineers do not differ significantly. Similar proportions of both report teaching (30 percent vs. 29 percent) and R&D (34 percent vs. 32 percent) as their primary work activities.

As with all doctoral scientists and engineers, over half (53 percent) of the Hispanics were employed by educational institutions, primarily 4-year colleges and universities. Hispanics, however, are less likely than non-Hispanics to be employed in business and industry (20 percent vs. 26 percent).

Within educational institutions, Hispanics are less likely than non-Hispanics to be tenured.[11] Of those who earned doctorates between 1960 and 1978, 54 percent of the Hispanics were tenured in 1979, as compared to 62 percent of all racial/ethnic groups combined. About 22 percent of the tenured Hispanics were foreign born. Hispanics also are less likely to hold full professorships. In 1979, 16 percent of the Hispanics held this rank, as compared to 28 percent of all racial/ethnic groups combined.

Figure 1-16. Field distributions of Ph.D. scientists and engineers: Hispanics and total, 1979



SOURCES: Appendix tables 7 and 36

CHAPTER 2

Labor Market Indicators

A number of statistical measures are useful in assessing relative labor market conditions (i.e., employment relative to available supply) for scientists and engineers. These measures include standard labor market indicators such as labor force participation rates, unemployment rates, salaries, measures of potential underemployment such as part-time employment, and a measure unique to scientists and engineers—the S/E utilization rate.

Labor force participation rates measure the fraction of the population of scientists and engineers in the labor force; that is, working or seeking employment. Low labor force participation rates imply that a significant fraction of those with S/E training and skills are not using their skills in S/E jobs or any other jobs.

Unemployment rates measure the proportion of those in the labor force who are not employed but seeking employment. Unemployment rates can indicate labor market problems and the different labor market experiences of men and women and of minorities and the majority. Higher unemployment rates for women and minorities may indicate that these groups face labor market problems different from those of men and the majority in the scientific and technical work force. Unemployment rates, however, are incomplete indicators of market conditions for scientists and engineers. They do not measure underutilization; that is, the number of scientists and engineers in positions requiring skills below those that the job holders actually possess. More importantly, they do not indicate how successful those with education and training in science and engineering are in finding jobs in science and engineering, nor do they count "discouraged" workers who have left the labor force altogether because they could find no suitable work at all.

To help measure the market conditions for scientists and engineers performing science and engineering work, NSF has developed the S/E utilization rate. This rate is a measure of the degree to which scientists and engineers who are working in any occupation or looking for work (i.e., in the labor force) actually have jobs in science or engineering.[1]

Degree of underemployment is also useful as an indicator of the extent to which scientists and engineers utilize their training and skills. When full-time jobs are not available, many accept part-time jobs, and when jobs in science or engineering are not available, some accept jobs outside of science or engineering. Thus, some part-time employment—e.g. working part-time but seeking full-time employment—is an indicator of underemployment. Working in a non-S/E job when S/E work would be preferred is another measure, although the latter is necessarily subjective since it depends on the perception of individuals who respond to survey questionnaires.

Salary comparisons between men and women and between minority and majority scientists and engineers reflect different labor force experiences among these groups.

The experience of recent S/E graduates can also provide a sensitive barometer of labor market conditions, since any changes in demand or employment practices are normally reflected in employer-hiring decisions. Therefore, where available, information pertaining to recent graduates is included as part of the overall discussion of the various measures of labor market conditions.

Disparities in these labor market variables between groups can reflect differences in labor market behavior, differences in demographic characteristics among the groups, differences in behavior of employers, or some combination of these factors. Depending on their causes, disparities can exaggerate problems or, alternatively, can mask subtle differences that have larger consequences.

One question that arises for racial minorities is the degree to which labor market indicators are influenced by the relatively large number of minority women. In 1979, for example, about 23 percent of the black doctoral scientists and engineers were women. Where data are available and where there are differences by sex within the racial or ethnic group, labor market indicators are presented for both men and women.

WOMEN SCIENTISTS AND ENGINEERS

Labor Force Participation Rates

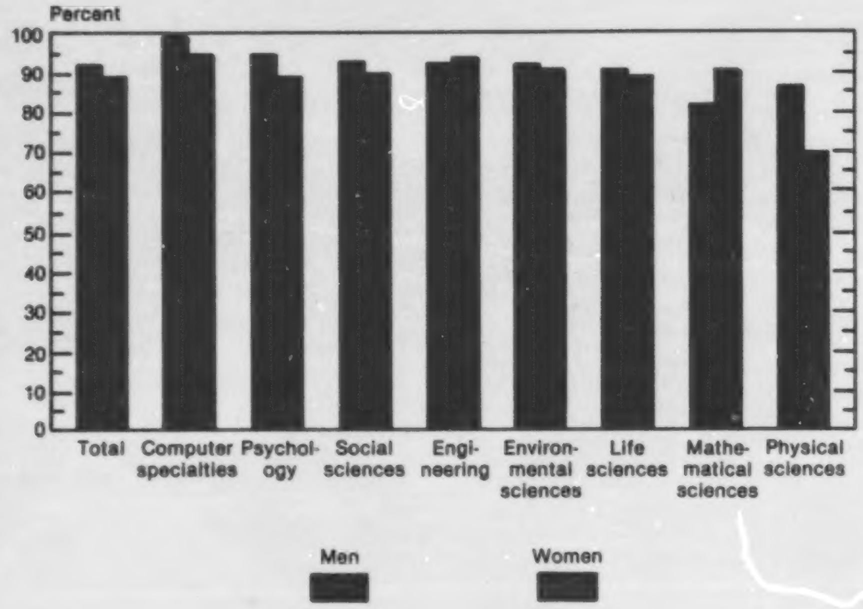
Women scientists and engineers have a strong attachment to the labor force. In 1978, almost 90 percent were in the labor force—that is, working or seeking employment. For men, the comparable rate was 92 percent. Since the mid-seventies, labor force participation of women scientists and engineers has risen 4 percentage points, while the rate for men remained essentially constant. The increasing participation of women in the labor force partially reflects the generally younger ages of women compared to men—young cohorts tend to participate in the labor force more than other age cohorts.

Labor force participation rates for both women and men vary by field. Within fields, the rates for women are generally only slightly lower than those for men, (e.g., 89 percent vs. 91 percent in the life sciences, 90 percent vs. 93 percent in the social sciences). There are, however, some exceptions. Female physical scientists are significantly less likely to be in the labor force (70 percent) than their male counterparts (87 percent). Female mathematical scientists and engineers are more likely than their male colleagues to be working or looking for work (91 percent vs. 82 percent for mathematical scientists, 94 percent vs. 92 percent for engineers) (figure 2-1).

While female and male scientists and engineers show roughly similar participation in the labor force, the participation of women scientists and engineers in the labor force is greater than that of all college-educated women. In 1978, 63 percent of all women and 90 percent of all men with 4 years of college were in the labor force.[2]

Among doctoral scientists and engineers, the proportion of women participating in the labor force is lower than that of men.

Figure 2-1. Labor force participation rates of scientists and engineers by sex and field: 1978



SOURCE: Appendix table 37

In 1979, the labor force participation rate for women was 90 percent, a rate substantially below the 96 percent rate for men. Although there is variation in the rates for both sexes by field, the rates for women within each field were below those for men (appendix table 37). Black and Asian women doctoral scientists and engineers both reported a higher labor force participation rate (94 percent) than white women (90 percent).

Women and men cited different reasons for not participating in the labor force (appendix table 44). About 40 percent of women doctoral scientists and engineers not in the labor force were retired, as compared to 75 percent of the men. Among experienced scientists and engineers at all degree levels, about 40 percent of the women but over 90 percent of the men who were not in the labor force were retired.

Marital status and child care responsibilities have a strong influence on the labor force participation of some women.[3] Among recent (1978 and 1979) S/E bachelor's graduates, labor force participation rates in 1980 were 94 percent for women and 98 percent for men (figure 2-2).[4] Among the 33 percent of married women with children, the labor force participation rate was 67 percent, as compared to 90 percent among those with no children. These comparisons suggest that marriage per se had little significant impact upon the labor force participation of women, but that the presence of children sharply reduced participation rates for some female scientists and engineers.

When field, age, and race are held constant (using multiple regression techniques), the probability of being in the labor force is 5 percentage points lower for doctoral women S/E's than for doctoral men. The presence of children also appears to reduce the propensity of doctoral women scientists and engineers to be in the labor force. Among married women with young children (i.e., under the age of 7), the labor force participation rate is 11 percentage points below that of men (88 percent vs. 99 percent); among married women with children under the age of 18, the rate is 9 percentage points below that of men (90 percent vs. 99 percent). Doctoral women scientists and engineers with no dependent children who are out of the labor force are generally retired.

Unemployment Rates

The unemployment rate for women scientists and engineers in 1978 was 2.4 percent, as compared to 1.3 percent for men (down from 2.7 percent in 1976). The unemployment rate for women scientists and engineers was slightly lower than the rate for all women in professional and technical fields (3.5 percent)[5] and for all women with four or more years of college (3.0 percent).[6] The 1978 unemployment rate for women scientists and engineers represents a considerable drop from the rate in 1976 of 6.8 percent. The improvement was concentrated among psychologists and social and life scientists.

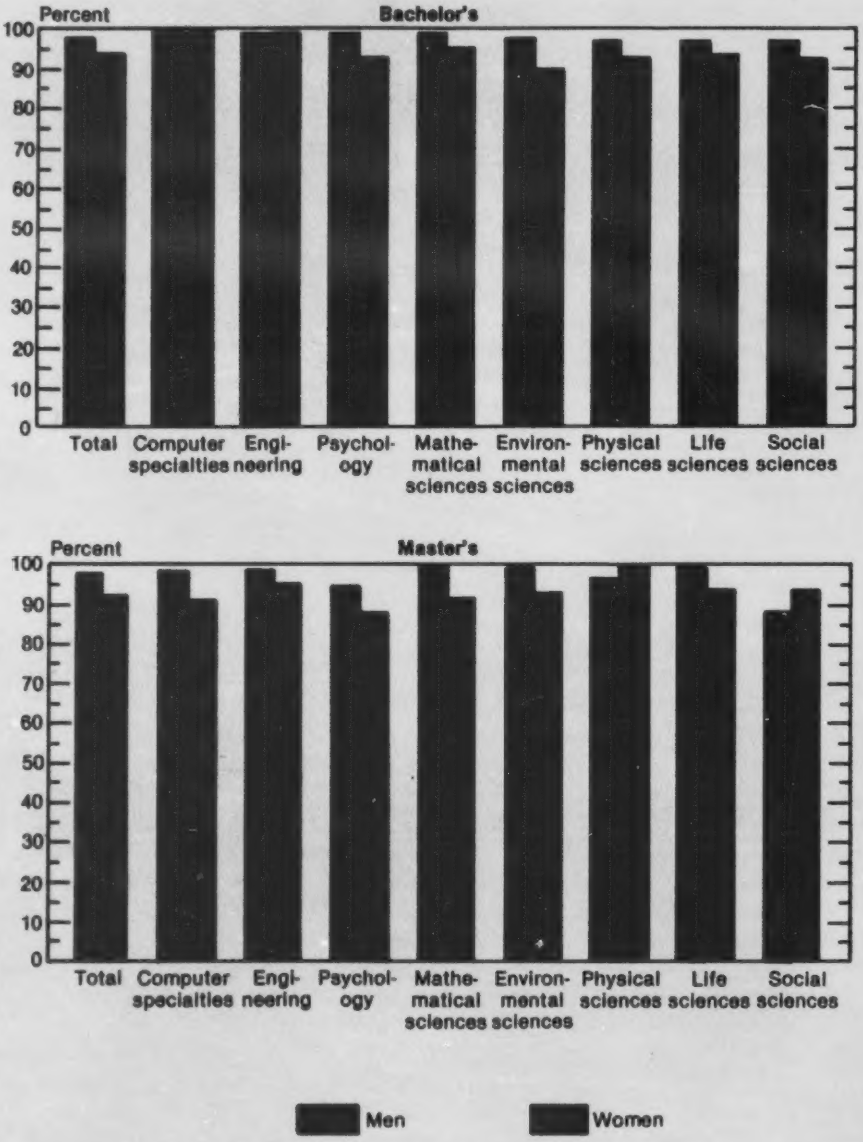
Although unemployment rates for women scientists and engineers in 1978 varied considerably by field, they were higher than those for men across most major fields (figure 2-3). The highest unemployment rate for women (6.3 percent) was in the physical sciences; this rate was well above the rate for men (1.7 percent). The lowest unemployment rate, almost zero, for both women and for men was in the computer specialties.

Among doctoral scientists and engineers in 1979, the unemployment rate for women (2.7 percent) was well above that for men (0.7 percent). This situation persisted across all fields of science (figure 2-3). Even when data are standardized for field, age, family characteristics (i.e., marital status and presence of children), and race by means of multiple regression analysis, only 10 percent of the difference in unemployment rates can be accounted for. Thus, most of the difference in unemployment rates between women and men doctoral scientists and engineers (90 percent) cannot be accounted for by these factors.

Black women doctoral scientists and engineers reported a lower unemployment rate than white women (2.0 percent vs. 2.7 percent). Asian doctoral women, however, reported an unemployment rate of 4 percent.

A comparison of unemployment rates for recent S/E graduates indicates that S/E women have experienced significantly more difficulty finding jobs than their male counterparts. In 1980, the unemployment rate for women S/E graduates who had received bachelor's degrees in 1978 and 1979 was 4.3 percent, compared to 3.2 percent for men; the unemployment rate for women master's degree recipients was 5.4 percent, compared to 1.2 percent for men. On a field-specific basis, differentials between rates for women and men were more variable (figure 2-4). For example, among 1978 and

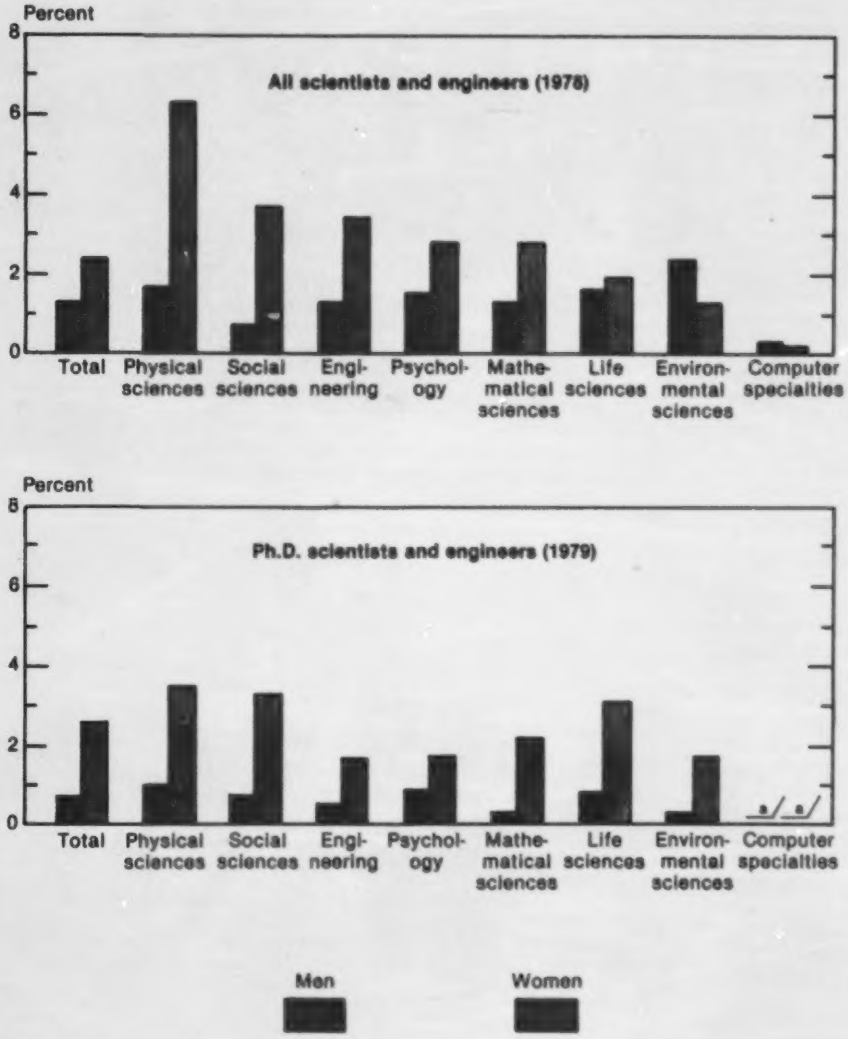
Figure 2-2. Labor force participation rates for recent[1] science and engineering graduates by sex and field: 1980



[1] Recent graduates are those who received a bachelor's or master's degree in 1978 or 1979.

SOURCE: Appendix table 50

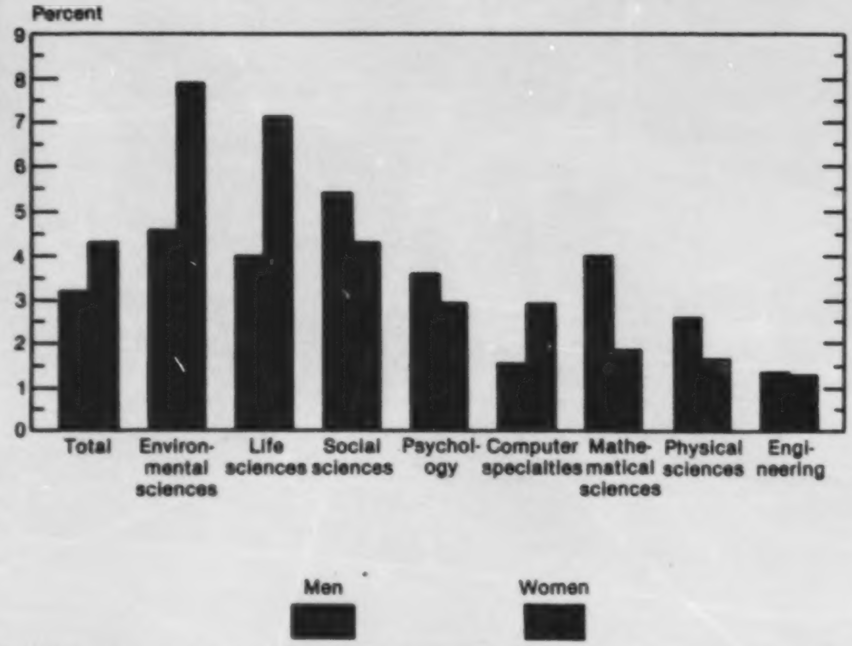
Figure 2-3. Unemployment rates by field and sex



[a] Too few cases to estimate.

SOURCES: Appendix tables 37 and 38

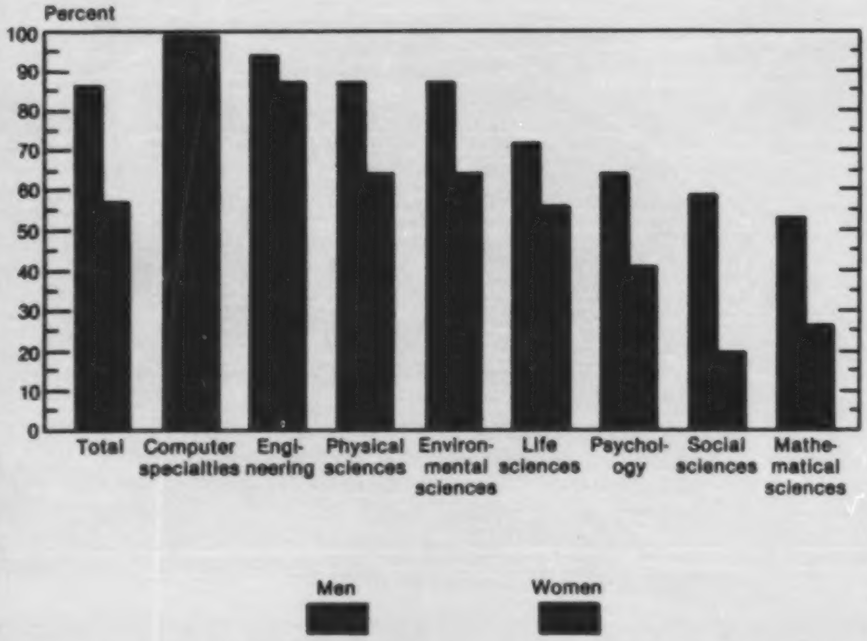
Figure 2-4. Unemployment rates of recent[1] S/E baccalaureates by sex and field: 1980



[1] Recent baccalaureates are those from the classes of 1978 and 1979.

SOURCE: Appendix table 50

Figure 2-5. S/E utilization rates by field and sex: 1978



SOURCE: Appendix table 37

1979 bachelor's degree graduates surveyed in 1980, women experienced higher unemployment rates in the computer specialties and life sciences, and lower unemployment rates in engineering and the mathematical and social sciences.

S/E Utilization Rates

The S/E utilization rate measures the extent to which scientists and engineers in the labor force are employed in science or engineering occupations. A low S/E utilization rate could be an indicator of underutilization—depending on the reasons for non-S/E employment and the extent of unemployment. Factors relating to non-S/E employment include lack of available S/E jobs, higher pay for non-S/E employment and locational preference.

Among all scientists and engineers in the labor force in 1978, men were much more likely than women to have jobs in science or engineering; the S/E utilization rate for men was 86 percent, compared to 57 percent for women.

S/E utilization rates for women in 1978 were lower than the rates for men in all fields except computer specialties (figure 2-5). The difference was greatest among social scientists (59 percent vs. 19 percent) and smallest among engineers (94 percent vs. 87 percent). Differences in field distribution explain about 40 percent of the difference in the overall male and female S/E utilization rates, but the other 60 percent remains unexplained. Even if the field distribution for women and men were identical, the S/E utilization rate for women, which would then increase from 57 to 74 percent, would still remain below the 86 percent rate for men.

Among doctoral scientists and engineers in 1979, the S/E utilization rates for women and men were closer (87 percent and 91 percent) than were the rates for other cohorts studied. However, rates for women were lower than those for men across all major fields except computer specialties and environmental sciences, where they were essentially equal.

As measured by the S/E utilization rate, black women doctoral scientists and engineers were less likely than their white and Asian counterparts to have jobs in science or engineering. In 1979, the S/E utilization rate for these black women was 83 percent, as compared to 87 and 90 percent for whites and Asians. In most fields, however, minority doctoral women reported rates similar to or higher than those of their white colleagues (text table 2-1). Notable exceptions were black women in the physical sciences and psychology and Asian women in psychology.

Table 2-1. S/E utilization rates for doctoral women scientists and engineers by field and race: 1979

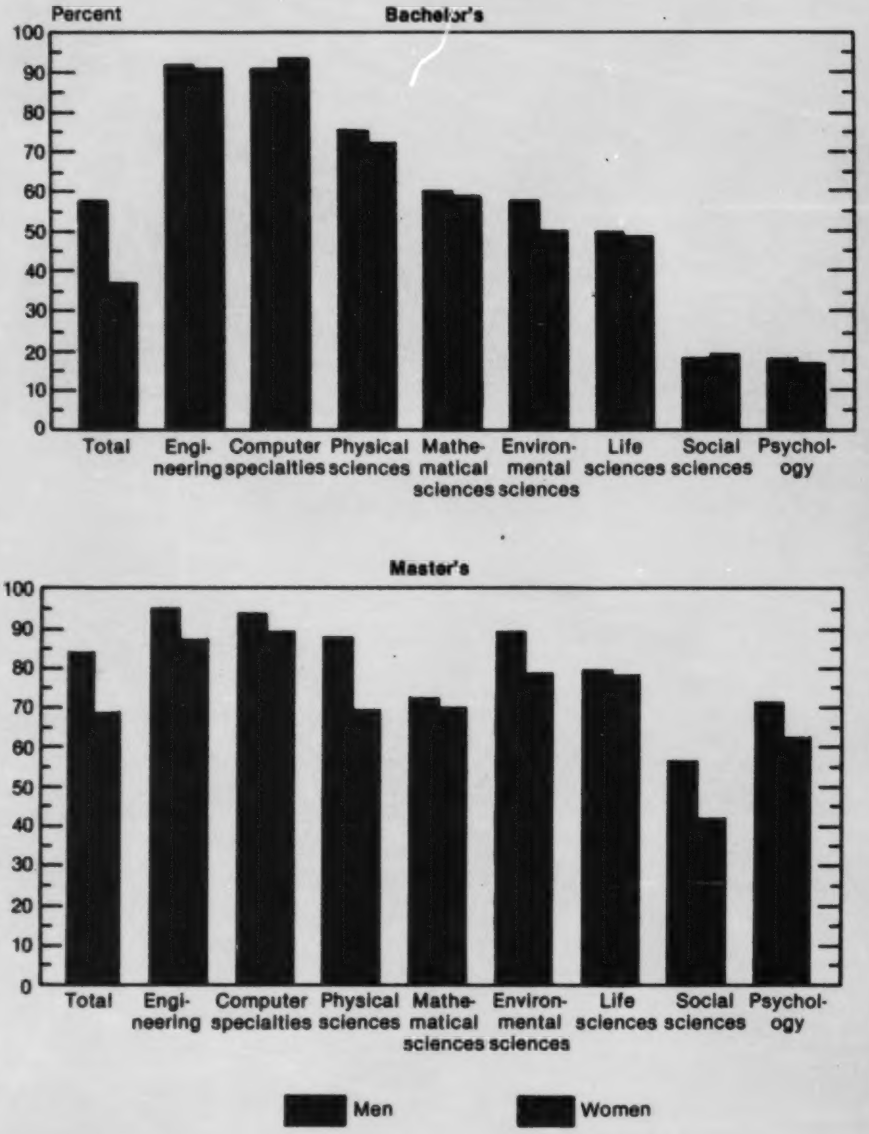
Field	White	Black	Asian
All fields	87	83	90
Physical sciences	86	80	85
Mathematical sciences	90	100	93
Computer specialties	99	100	100
Environmental sciences	96	100	100
Engineering	91	100	96
Life sciences	91	90	95
Psychology	90	81	74
Social sciences	77	76	83

Source: Appendix table 41.

Among recent S/E graduates, the S/E utilization rate for women was considerably below that for men at both the bachelor's and master's levels (appendix table 60). Among 1978 and 1979 bachelor's degree recipients, the S/E utilization rate for women in 1980 was 37 percent, compared to 58 percent for men. This difference was partly a reflection of the fact that over a third of the men were engineers and over one-half of the women were social scientists. If engineering graduates are eliminated from the analysis and only science graduates are considered, the S/E utilization rates for men and women are more similar (41 percent and 34 percent) (figure 2-6). Within individual fields, differences in S/E utilization rates between men and women were small, although the rates for women were generally below those for men. Only among computer specialists was the rate for women above that for men (figure 2-6).

For both men and women, S/E utilization rates increase with additional years of education, but those for women remain below those for men across all major fields. At the master's level, the S/E utilization rate in 1980 for recent male degree recipients was 84 percent, up from 58 percent for bachelor's recipients; for recent female master's graduates, the rate was 67 percent, up from 37 percent for bachelor's. These relatively low baccalaureate rates for both sexes in some science fields (e.g., psychology and social sciences) suggest that for these fields the bachelor's is not an adequate entry level degree in most labor markets.

Figure 2-6. S/E utilization rates for recent[1] graduates by sex and field: 1980



[1] Recent graduates are those who received a bachelor's degree in 1978 or 1979.

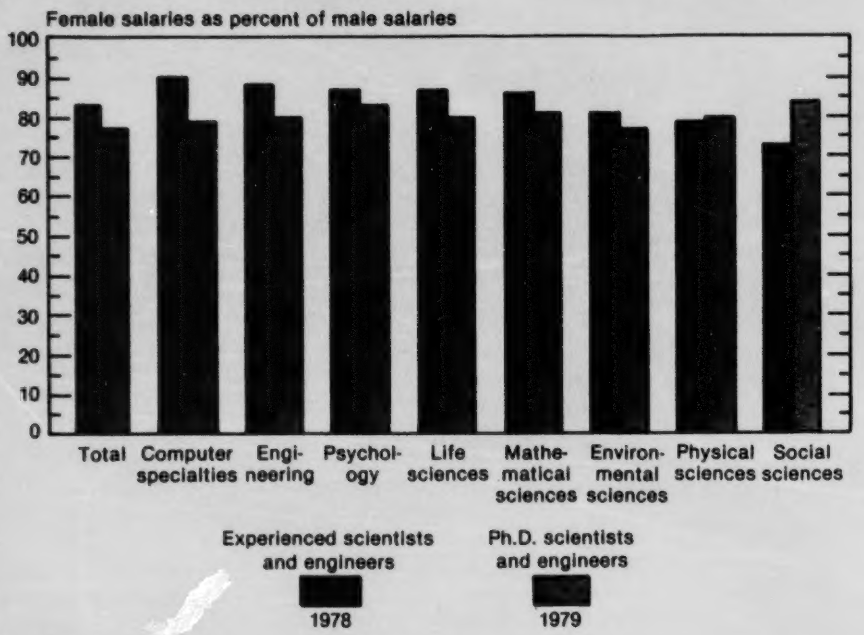
SOURCE: Appendix table 50

Salaries

Salary differences between male and female scientists and engineers reflect differences in labor market behavior, demographic characteristics, employer behavior, or some combination of these factors.

Among doctoral scientists and engineers in 1979, average salaries paid to women were 77 percent of those paid to men (figure 2-7). For all fields combined, the average annual salary for men with S/E doctorates was $29,900; the average for women was $23,100. This pattern appears across all S/E occupations and across all types of employer and work activities. If data are standardized for occupation, race, sector of employment, and years of professional experience, the differential narrows from 23 to 10 percent. Thus, over half of the sex differential in salaries can be attributed to these factors, but almost half remains unexplained.

Figure 2-7. Comparison of salaries of scientists and engineers by sex



SOURCES: Based on appendix tables 42 and 43

Since the early seventies, salaries for women doctoral scientists and engineers have increased more slowly than salaries for men. Between 1973 and 1979, median salaries increased by 34 percent for women doctoral scientists and engineers; for men, the increase was 42 percent. Data for comparable years of professional experience show salaries for women with 21 to 25 years of experience ranging between 15 and 25 percent lower than those of men, depending on field examined, and ranging between general parity and 13 percent for those with 2 to 5 years of experience (text table 2-2).

Among different racial groups of women doctoral scientists and engineers, black women reported average salaries of $24,100—higher than the salaries of their white, native American, and Asian colleagues, who were paid $23,000, $21,600, and $23,100, respectively (text table 2-3).

Regardless of degree level, experienced male scientists and engineers earned substantially higher annual salaries in 1978 than women ($27,400 vs. $22,600). Salaries for female scientists and engineers averaged 82 percent of those for men overall, and ranged from 73 percent of male salaries for social scientists to 90 percent for computer specialists (figure 2-7).

Among recent (1978 and 1979) S/E graduates, male-female salary differentials existed in 1980 at all degree levels and for most fields (figure 2-8). At the bachelor's level, women earned less than men in all fields except engineering. Social scientists reported the lowest salaries, and women social scientists were paid 81 percent of the salaries of men (appendix table 52).

Recent S/E graduates employed in S/E jobs generally enjoyed higher salaries than comparable graduates in non-S/E jobs. Among the recent bachelor's graduates holding S/E jobs, women's salaries were 71 percent of men's salaries. The "premium" for working in S/E jobs was also less for women than for men. Women in S/E jobs earned $2,300 (21 percent) more than women in non-S/E jobs; for men, the premium was a $4,600 (32 percent).

This same general pattern of higher salaries for men was evident among recent S/E master's degree recipients. At this level, women's salaries for all employment and for science and engineering employment were 72 percent and 75 percent, respectively, of male salaries. Women holding master's degrees earned less than men across all major S/E fields (appendix table 52).

Table 2-3. Median annual salary of doctoral women scientists and engineers by race: 1979

Race	Median salary
Total	$23,100
White	23,000
Black	24,100
Asian	23,100
Native American	21,600

Source: National Science Foundation, *Characteristics of Doctoral Scientists and Engineers in the United States, 1979* (NSF 80-323).

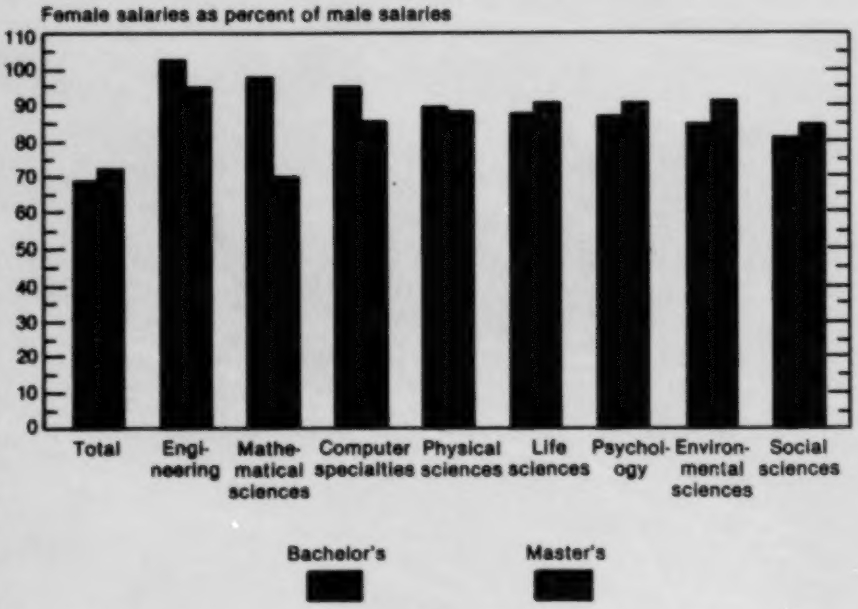
Table 2-2. Median annual salaries of doctoral scientists and engineers with 2 to 5 and 21 to 25 years of experience by sex and field of doctorate: 1979

	Field of doctorate											
Years of experience and sex	All fields	Mathematical sciences	Computer sciences	Physics/ astronomy	Chemistry	Environmental sciences	Engineering	Agricultural sciences	Medical sciences	Biological sciences	Psychology	Social sciences
2-5 years												
Men	$22,300	$19,900	$22,300	$22,500	$24,600	$22,600	$26,400	$21,100	$24,500	$20,500	$20,300	$19,900
Women	19,700	19,800	(1)	22,100	22,200	19,500	24,600	20,300	23,100	18,300	19,700	19,500
21-25 years												
Men	35,000	34,200	(1)	37,400	35,400	36,700	36,900	32,700	39,300	33,900	34,900	31,000
Women	28,900	26,400	(1)	32,000	26,900	(1)	(1)	(1)	30,500	29,300	30,300	25,700

[1] Fewer than 20 sample cases reported; therefore, no median annual salary computed.

Source: *Science, Engineering and Humanities Doctorates in the United States 1979 Profile*, National Academy of Sciences, 1980.

Figure 2-8. Comparison of salaries of recent[1] graduate scientists and engineers by sex



[1]Recent S/E graduates are those who received a bachelor's or master's degree in 1978 or 1979.

SOURCE: Appendix table 52

Table 2-4. Reasons for non-S/E employment by sex (percent)

	Total in non-S/E	Prefer non-S/E	Promotion	Better pay	Locational preference	S/E job not available	Other[1]
Experienced scientists and engineers (1978)							
Men	100	15	35	8	7	7	29
Women	100	17	8	19	13	13	30
Doctoral scientists and engineers (1979)							
Men	100	21	23	6	1	8	41
Women	100	19	14	5	3	23	37
Bachelor's (1978 and 1979 classes in 1980)							
Men	100	51	2	16	4	21	7
Women	100	58	1	10	5	23	3
Master's (1978 and 1979 classes in 1980)							
Men	100	73	2	7	2	12	5
Women	100	73	1	4	5	17	1

[1]Includes no report.

Source: Appendix tables 44 and 53.

Underemployment

Depending upon the reason (e.g., preference for an S/E job but perceiving that none is available), non-S/E employment may be an indicator of underutilization.

Women are more likely than men to be in non-S/E jobs. Reasons cited for working outside of science and engineering differ between the sexes (text table 2-4). Among experienced scientists and engineers, almost 60 percent of the men and almost 45 percent of the women in non-S/E jobs said they were in such jobs because of personal preference, promotions, or higher pay, but a larger proportion of women (13 percent) than men (7 percent) said they were in non-S/E jobs because they believed jobs in science and engineering were not available. In addition, women were almost twice as likely as men to cite locational preference as the reason for working outside of science or engineering (13 percent vs. almost 7 percent). Among both sexes, however, 30 percent did not report reasons for non-S/E employment.

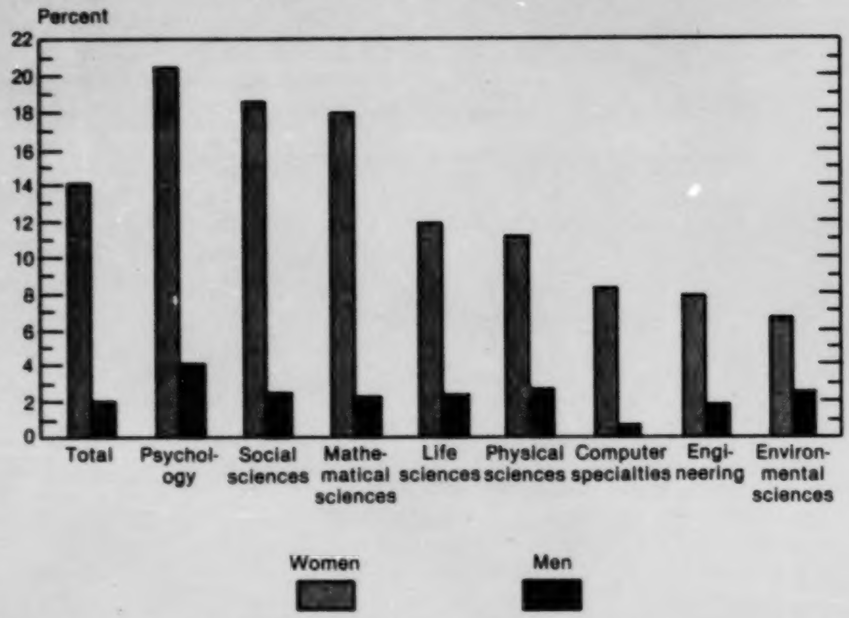
Among doctoral scientists and engineers, more women than men (23 percent vs. 8 percent) reported the perception that a job in science or engineering was not available as the principal reason for working outside of science or engineering (text table 2-4). Women were also more likely than men to cite locational preference as the reason for non-S/E employment, but the percent for both sexes was very low. Non-S/E preference, promotions, or better pay were more often cited by men than women as reasons for non-S/E employment (50 percent vs. almost 40 percent). Roughly 40 percent of both men and women, however, did not report their reasons for non-S/E employment.

Among recent S/E graduates at the bachelor's level, women were somewhat more likely than men to cite preference as the reason for non-SE employment (text table 2-4), whereas men were more likely than women to cite better pay and promotion. At the master's level, reasons for non-S/E employment for women and men were similar. Over 80 percent of both men and women cited preference, promotion, pay or location as reason for working outside of science and engineering.

Depending on the reason for accepting the job, part-time work may be an indicator of underutilization. Some people work part time because they choose to; others work part time but would prefer full-time employment. This latter group could be considered underutilized.

In the total U.S. work force, women are more than twice as likely as men to hold part-time jobs. In 1980, about 25 percent of employed women and 9 percent of employed men were working part time.[7] Scientists and engineers were less likely to be employed part time. Among experienced scientists and engineers,[8] women were more likely than men to hold part-time jobs; of

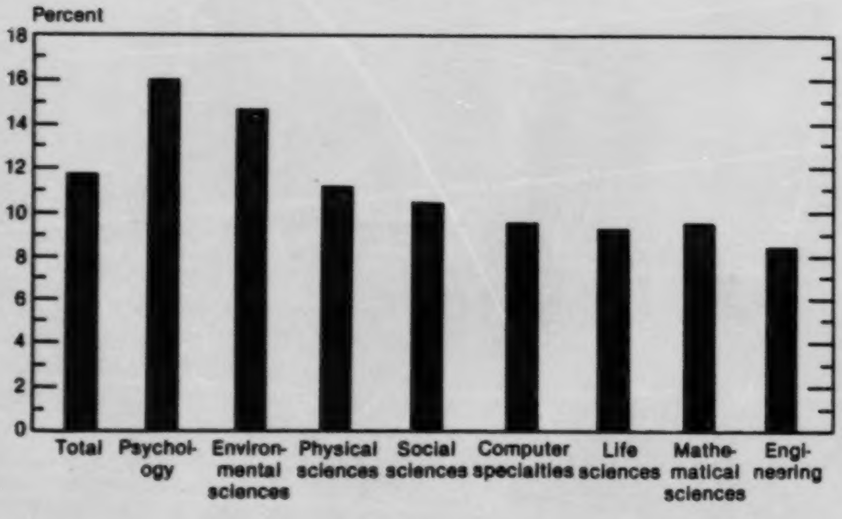
Figure 2-9. Percent working part time by field and sex: experienced[1] scientists and engineers, 1978



[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

SOURCE: Appendix table 31

Figure 2-10. Percent working part time by field: female Ph.D. scientists and engineers, 1979



SOURCE: Appendix table 31

the 35,000 women employed in 1978, about 14 percent were working part time, as compared to 2 percent of the men. Regardless of sex, almost one in five of those working part time was seeking full-time employment.[9] Thus, roughly 2 percent of the women but less than 0.5 percent of the men in the experienced S/E work force would be considered underutilized.

Part-time employment was more prevalent among scientists than engineers and varied among science fields, with part-time employment more prevalent in those fields where demand relative to supply was weak. For women, the ratios of part-time to total employment were highest among psychologists and social and mathematical scientists. Almost one-fifth of the employed women in these fields were working part-time (figure 2-9). The lowest ratios of part-time to total employment for women were found among engineers and environmental scientists.

Among doctoral scientists and engineers, women were also much more likely than men to be employed part-time. In 1979, almost 12 percent of the women but less than 3 percent of the men were working part time, and about one in five of both sexes was seeking full-time employment. Thus, over 3 percent of the female and 1 percent of the male doctoral S/E labor force may be underutilized.

Almost two-thirds of the women doctoral scientists and engineers employed part time in 1979 were life scientists and psychologists (over 60 percent of doctoral women scientists and engineers employed were in these two fields). Among doctoral women, the ratio of part-time to total employment varied by field, with the highest ratio found in psychology and environmental sciences (figure 2-10). The field distribution of part-time to full-time employment followed a similar pattern for men and women.

About 57 percent of the white doctoral women holding part-time jobs were either psychologists or social scientists, and an additional 27 percent were life scientists. About 85 percent of black women doctorates and 58 percent of the Asian women doctorates working part time were also in these fields.

Part-time employment among men doctoral scientists and engineers has been increasing at a faster rate than among women. From 1973 to 1979, part-time employment among women increased at an annual rate of about 7 percent; for men, the increase was slightly over 10 percent.

RACIAL MINORITY SCIENTISTS AND ENGINEERS

Labor Force Participation Rates

Regardless of race, scientists and engineers have high rates of participation in the labor force. Both black and Asian scientists and engineers reported labor force participation rates of 95 percent or higher in 1978. For whites, the rate was 91 percent. Since the mid-1970's, the labor force participation rate has remained relatively constant for whites while rising slightly for blacks and Asians. Generally, black and Asian scientists and engineers were younger than their white colleagues and were therefore less likely to be out of the labor force because of retirement or poor health. Higher labor force participation rates for blacks and Asians, compared to the rates for whites, were evident across most S/E fields (figure 2-11).

Minority scientists and engineers were more likely to participate in the labor force than minority college graduates in general. Roughly 88 percent of all minority graduates were in the labor force,[10] somewhat below the rate reported for minority scientists and engineers.

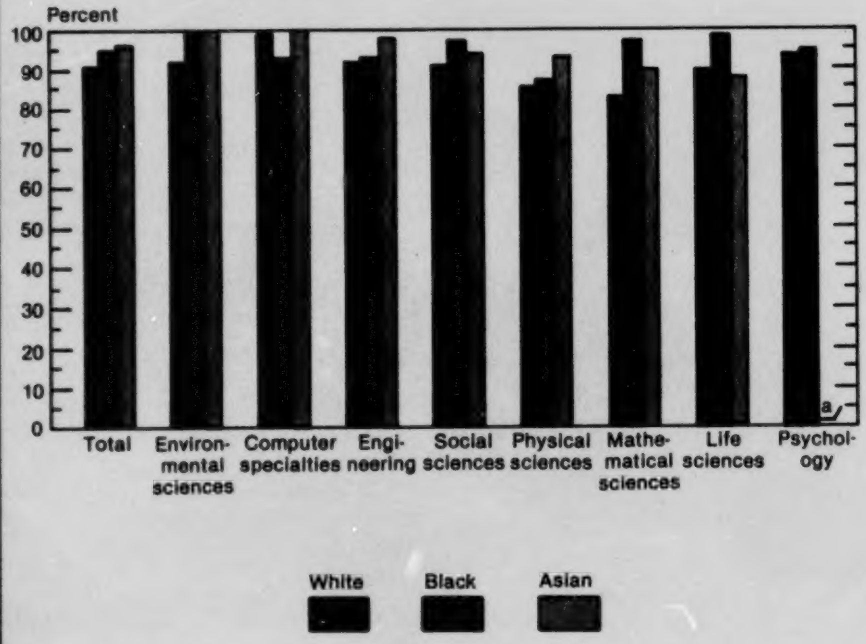
Labor force participation rates for minority doctoral scientists and engineers were higher than the rates for those at other degree levels. In 1979, black doctoral scientists and engineers reported a rate of 95 percent, the same as the rate for whites, while Asians reported a rate of 98 percent. There was little variation by field (appendix table 40). Native American doctoral scientists and engineers, of whom there were almost 1,000 in 1979, reported a labor force participation rate of 97 percent.

Labor force participation was also strong for S/E graduates at both the bachelor's and master's degree levels. Only black bachelor's degree recipients in mathematical sciences, black master's degree recipients in engineering, and Asian master's degree recipients in social sciences showed labor force participation rates below 90 percent (appendix table 51).

Unemployment Rates

Overall unemployment rates for scientists and engineers did not, on average, vary by race. Black, white and Asian scientists and engineers experienced about the same unemployment rates in 1978, 1.5 percent, compared to, for example, 4.7 percent for all blacks with 4 or more years of college.[11]

Figure 2-11. Labor force participation rates by field and race: 1978



ªToo few cases to estimate.

SOURCE: Appendix table 38

Among doctoral scientists and engineers, blacks reported higher unemployment rates than their Asian or white colleagues (2.8 percent, representing 100 individuals, vs. about 1 percent, representing 2,700 individuals). The largest number of unemployed black doctoral scientists (43) were social scientists. Among blacks, the unemployment rate for men (3 percent) was above that for women (2 percent).

Among recent S/E graduates, blacks have significantly higher unemployment rates than either whites or other minorities at both the bachelor's and master's degree levels. In 1980, the black unemployment rate was over 9 percent at the bachelor's level, compared to 3.3 percent for whites and 4.8 percent for other minorities. At the master's level, black S/E gradautes had an unemployment rate of almost 13 percent, compared to 2.6 percent for whites (appendix table 51).

If adjustments are made for field differences, the unemployment rate for black recent graduates at the bachelor's level declines to about 7 percent (from 9 percent), still considerably above the rate for whites.

S/E Utilization Rates

The S/E utilization rate is a measure of the degree to which those scientists or engineers who are working in any occupation or looking for work (i.e. the labor force) have jobs in science or engineering. Among experienced scientists and engineers,[12] blacks, Asians, and whites had similar S/E utilization rates in 1978 (98 percent for Asians, 93 percent for blacks, and 95 percent for whites).

Among doctoral scientists and engineers, blacks were slightly less likely than others to hold jobs in science or engineering, while native Americans and Asians were the most likely to hold such jobs. In 1979, the S/E utilization rate was 86 percent for blacks, 93 percent for native Americans and Asians, and 91 percent for whites (appendix table 40). S/E utilization rates in most fields were lower for black doctoral scientists and engineers than for whites; the exceptions were in the mathematical and environmental sciences and computer specialties. The lower S/E utilization rate for blacks was only slightly affected by the relatively large number of black women. In 1979, the rate for black men was slightly above 86 percent; for black women, it was slightly over 83 percent.

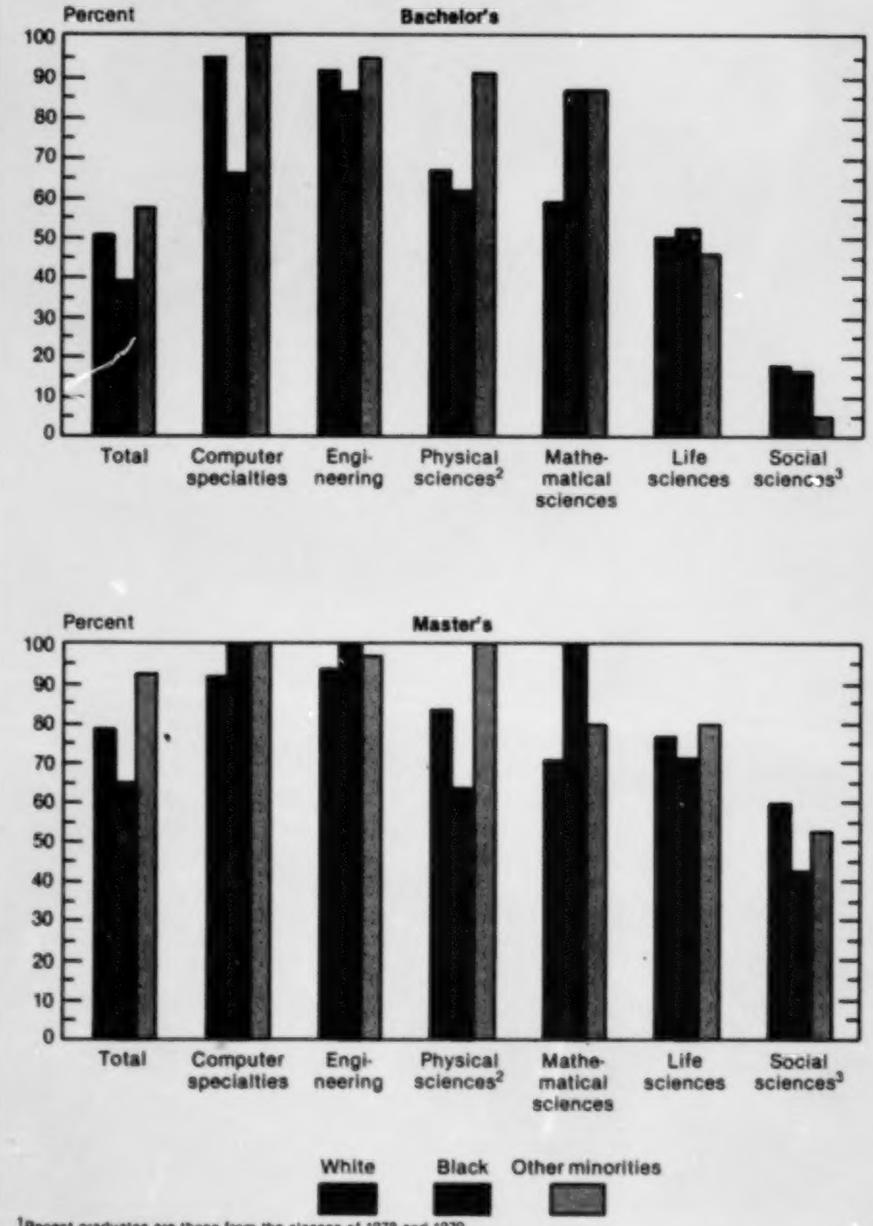
S/E utilization rates in social sciences were low for all races at all degree levels. For example, the S/E utilization rate in 1979 for doctoral social scientists was only 81 percent for all races combined. However, 28 percent of black doctoral scientists and engineers were social scientists in 1979, compared to 16 percent of the whites and only 2 percent of the Asians. In addition, almost one-half of the black doctoral scientists and engineers who were not in S/E jobs in 1979 were social scientists.

In 1980, the S/E utilization rate for recent (1978 and 1979) S/E bachelor's graduates who were not full-time graduate students in 1980 was 51 percent for whites, 39 percent for blacks, and 58 percent for other minorities (figure 2-12).[13] The relatively low rate for blacks results, again, in part, from the concentration of blacks in the social sciences. Almost 40 percent of the black recent graduates who did not attend graduate school full-time earned their degrees in the social sciences, as compared to 24 percent of the comparable group of white graduates. The relatively high S/E utilization rate for other minorities reflects the concentration of Asians in engineering fields, where the rate was relatively high for all races.

Among recent S/E bachelor's graduates, blacks generally had lower S/E utilization rates than whites or other minorities, regardless of field. The most significant exception was among blacks graduating in mathematical science; this group had an S/E utilization rate almost 30 points higher than that of whites (87 percent vs. 59 percent).

At the master's level, S/E utilization rates were higher for blacks than at the bachelor's level. Again, the rate for blacks (65 percent) was lower than that for whites (79 percent) or other minorities (93 percent). The S/E utilization rate for blacks was above that for whites among mathematical scientists, engineers, and computer specialists (by 30, 3, and 8 percentage points) and below that for whites among physical scientists (by 19 points). For all races, the rates among social scientists were lower than for those in other major fields; however, the rate for black social scientists (43 percent) was well below that for whites (60 percent).

Figure 2-12. S/E utilization rates of recent[1] graduates by field and race: 1980



[1] Recent graduates are those from the classes of 1978 and 1979.
[2] Includes environmental sciences.
[3] Includes psychology.
SOURCE: Appendix table 51

Salaries

Among doctoral scientists and engineers, whites earned, on average, higher salaries than Asians, blacks, and native Americans. For all fields combined, average yearly salaries in 1979 were $29,200 for whites, $28,200 for Asians, $26,600 for blacks, and $25,800 for native Americans. This same general pattern, with some exceptions, was evident across all S/E fields and across all types of employer and work activities. However, Asian computer specialists reported higher salaries than whites, and black social scientists reported higher salaries than their white or Asian colleagues. Salaries for blacks reflect, to some extent, the relatively large number of black women among blacks holding doctorates (23 percent in 1979). Among black doctoral scientists and engineers, annual salaries were $27,500 for men and $24,100 for women.

Among recent (1978 and 1979) S/E graduates at the bachelor's level, whites, on average, earned $2,000 more than blacks in 1980, while other minorities (primarily Asians) earned almost $4,000 more than blacks. Among this group, blacks earned higher salaries than whites in engineering and mathematical sciences (figure 2-13), and other minorities earned slightly higher salaries than whites in the life and social sciences.

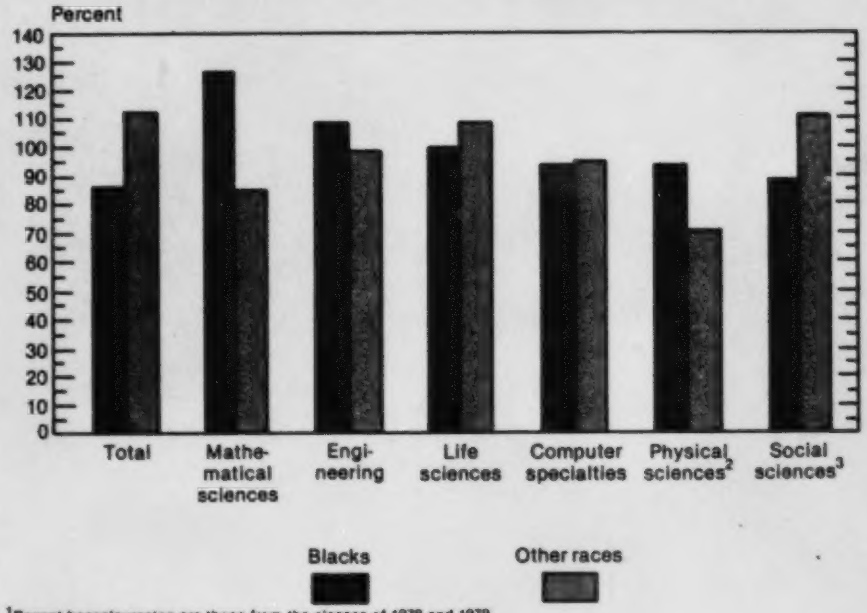
Underemployment

Unemployment rates and S/E utilization rates are only partial indicators of the extent to which those with S/E training utilize their training and skills in their work activities. Some scientists and engineers are employed part-time. Moreover, among scientists and engineers who are either employed part time or in non-S/E jobs, some are so employed by choice and others are so employed involuntarily. In order to assess the extent to which non-S/E and part-time employment may represent underemployment, therefore, one must further investigate the reasons for these employment statistics.

The reasons for non-S/E employment among doctorates vary somewhat by race (text table 2-5). Although Asian S/E doctorates were more likely than either whites or blacks to hold jobs in science or engineering, Asians were more likely than other racial groups to report that S/E jobs were not available and least likely to cite promotion as the reason for working outside of science and engineering. For each racial group, however, 40 to 50 percent of those working outside of science and engineering did not report reasons for this non-S/E employment.

Among recent (1978 and 1979) S/E graduates, the reasons for employment outside science and engineering also varied among the racial groups. Blacks at the bachelor's level were more likely than whites to report that S/E positions were not available (text table 2-5). For example, of the recent bachelor's graduates not in S/E jobs in 1980, over one-third of the blacks, compared to 21 percent of whites, said they believed S/E jobs were not available.

Figure 2-13. Salaries of racial minorities (as a percent of white) for recent[1] S/E baccalaureates by field: 1980



[1] Recent baccalaureates are those from the classes of 1978 and 1979.
[2] Includes environmental sciences.
[3] Includes psychology.

SOURCE: Appendix table 52

Table 2-5. Reasons for non-S/E employment by race (percent)

	Total in non-S/E	Prefer non-S/E	Promotion	Better pay	Locational preference	S/E job not available	Other[1]
Doctoral scientists and engineers (1979)							
White	100	20	23	6	1	9	40
Black	100	19	30	4	3	6	39
Asian	100	21	0.3	9	1	12	49
Bachelor's (1978 and 1979 classes in 1980)							
White	100	55	1	13	4	21	5
Black	100	45	1	7	5	35	6
Asian	100	43	--	27	11	19	--
Master's (1978 and 1979 classes in 1980)							
White	100	72	2	5	3	14	4
Black	100	89	--	--	--	11	--
Asian	100	58	--	27	--	15	--

[1] Includes no report.

Source: Appendix tables 45 and 54.

Scientists and engineers hold part-time jobs for a variety of reasons, but part-time employment where full-time work is preferred is an indicator of underutilization. The levels of and racial differences in the propensity to work part time were small. Among experienced scientists and engineers, roughly 2 percent were working part time, with both whites and Asians slightly more likely than blacks to be employed on a part-time basis. At the doctoral level, blacks and whites were more likely than Asians to work part time. For example, in 1979, 4.5 percent of the blacks, 3.6 percent of the whites, and 1.3 percent of the Asians were working part time (appendix table 32).

HISPANIC SCIENTISTS AND ENGINEERS

Among those doctoral scientists and engineers reporting Hispanic heritage, the labor force participation rate in 1979 was 98 percent, comparable to that for Asians. The S/E utilization rate for Hispanic doctoral scientists and engineers (89 percent) was higher than that for blacks (86 percent), but lower than that for Asians, whites, and native Americans (all above 90 percent).

REFERENCES

1. The S/E utilization rate is computed by dividing the number employed in science and engineering jobs by the labor force—that is, those employed in any job or seeking employment.

$$\text{S/E utilization rate} = \frac{\text{S/E employment}}{\text{labor force}} \times 100$$

2. The U.S. Department of Labor, Bureau of Labor Statistics, *Educational Attainment of Workers: Some Trends from 1973 to 1978*, Special Labor Force Report No. 225, Wash., p. A-8.

3. See Jacob Mincer and Solomon Polachek, "Family Investments in Human Capital: Earnings of Women," *Journal of Political Economy*, Vol. 82, No. 2, Pt. 2 (1974), pp. 76-108; "Working Mothers in the 1970's," *Monthly Labor Review*, October 1979, pp. 39-49; "Labor Force Patterns of Single Women," *Monthly Labor Review*, August 1979, pp. 46-49; James E. Long and Ethel B. Jones, "Labor Force Entry and Exit by Married Women," *Review of Economics and Statistics*, February 1980, pp. 1-6; and "Back To School at 35 and Over," *Monthly Labor Review*, August 1979.

4. Excluding full-time graduate students. Full-time graduate students are also excluded from the remainder of this analysis.

5. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 27, No. 1, Washington, 1980, p. 167.

6. *Educational Attainment of Workers*, p. A-8.

7. U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Vol. 28, No. 1, Washington, 1981, p. 34.

8. Those scientists and engineers in the labor force at the time of the 1970 Census of Population. For a complete description of this population, see *Characteristics of Experienced Scientists and Engineers, 1978*, NSF 79-322.

9. National Science Foundation, unpublished data.

10. *Educational Attainment of Workers*, p. A-9.

11. *Ibid.*

12. Experienced scientists and engineers are defined as those who were in the labor force at the time of the 1970 Census of Population.

13. An estimated 84 percent of the other minorities were Asians.

CHAPTER 3

Education and Training

Women and minorities are underrepresented in S/E employment. This underrepresentation reflects the fact that women and minorities do not participate in science and engineering education and training to the same extent as white males. The proportion of women and racial minorities earning degrees or holding postdoctoral appointments in science and engineering, and relative changes in these statistics over time, are indicators of potential disparities.

A number of factors play important roles in influencing entrance to undergraduate or graduate S/E programs, including scores on standardized tests and high school coursework. Some tests, such as the Scholastic Aptitude Test (SAT) or the Graduate Record Examination (GRE), are widely used by academic institutions for admission decisions. Relatively "low" scores on these tests may discourage individuals from selecting a major in science or engineering or limit choice of scientific fields. However, factors such as role models, financial resources, expected job opportunities, and a host of social, cultural and psychological variables also influence these decisions.

Test scores must be interpreted very carefully. The Educational Testing Service, which develops the SAT and GRE, states that scores on standardized tests "...cannot completely represent the potential of any person, nor can they alone reflect an individual's chances of long-term success in an academic environment. It should be remembered that the... (tests) provide measures of certain types of developed abilities and achievement, reflecting educational and cultural experience over a long period. Special care is required in interpreting the... (test) scores of students who may have had an educational and cultural experience somewhat different from that of the traditional majority."[1]

WOMEN

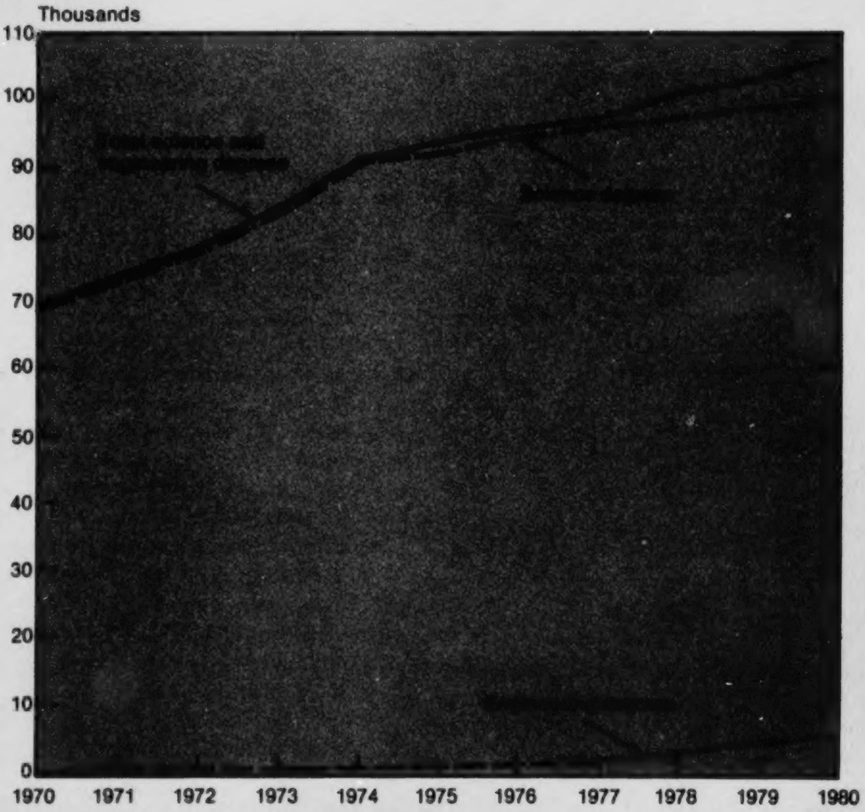
Earned Degrees in Science and Engineering

Although still underrepresented in S/E training, women have made steady gains in recent years at virtually every educational level. In the 1970's, the number and proportion of women studying science and engineering increased substantially at both the undergraduate and graduate levels.

Bachelor's Degrees—Between 1970 and 1980, the proportion of S/E degrees awarded to women increased from 26 percent to 36 percent (appendix table 55). In comparison, over 51 percent of the 1976 class of high school graduates—the major component of the pool from which these degree recipients emerge—was female.[2] Female participation in S/E training at the baccalaureate level increased in every field except mathematical science, where it remained constant (36 percent in both 1970 and 1980). In 1980, over 105,000 women earned bachelor's degrees in S/E fields (figure 3-1).[3]

The largest change in the numbers of bachelor's degrees awarded has occurred in fields in which the representation of women has been small. In engineering, the number and proportion of bachelor's degrees earned by women increased from almost 0.7 percent (350) in 1970 to almost 10 percent (6,100) in 1980. In computer and information sciences, the proportion of degrees earned by women doubled from almost 14 percent in 1971 to over 28 per-

Figure 3-1. Science and engineering bachelor's degrees awarded to women: 1970–1980



SOURCE: Appendix table 55

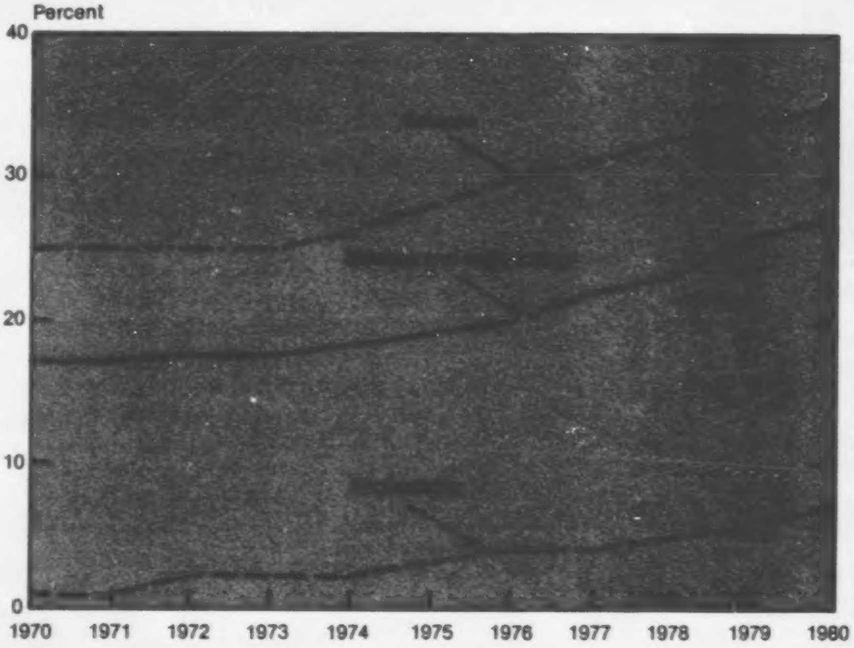
cent in 1979, and the number increased from 300 to 2,500.

In 1980, women received 39 percent (almost 28,000) of the bachelor's degrees in the life sciences and over half (58,000) of the degrees in the social sciences, up substantially from 1970, when these proportions were 23 percent and 37 percent, respectively.

Advanced Degrees—Significant increases have also occurred in both the number and proportion of women receiving master's and doctorates in science and engineering (appendix tables 56 and 57). In 1970, approximately 10,000 women received advanced degrees[4] in science and engineering, accounting for just over 15 percent of the advanced S/E degrees awarded in these fields. By 1980, the number of women receiving advanced S/E degrees had increased to over 18,000, or 25 percent of the advanced S/E degrees awarded. These increases must be placed in perspective, for women earned almost 50 percent of all master's degrees and almost 30 percent of all doctorates awarded in 1980.

Between 1970 and 1980, the number of women receiving master's degrees in S/E fields increased by 69 percent, from about 8,600 to 14,500 (appendix table 56). Expressed as a percentage of all S/E master's degrees, women accounted for 17 percent in 1970 and almost 27 percent in 1980 (text table 3-1).

Figure 3-2. Percent of all S/E master's degrees awarded to women: 1970–1980



SOURCE: Appendix table 56

Table 3-1. Women S/E master's degree recipients as a percent of total S/E master's degree recipients by selected year and field

Field	1970	1975	1980
Total, science and engineering	17	20	27
Physical and environmental sciences	14	15	19
Mathematical and computer sciences ..	25	27	28
Engineering	1	3	7
Life sciences	26	25	32
Social sciences	29	34	46

Source: Appendix table 56.

Although the proportion of women receiving master's degrees increased in all S/E fields, the most significant increase was in engineering (from 1 percent in 1970 to 7 percent in 1980) (figure 3-2 and text table 3-1).

The number of women receiving doctoral degrees in S/E fields more than doubled between 1970 (1,600) and 1980 (3,800) (appendix table 57). By comparison, the number of men receiving doctorates in these fields decreased from 16,000 to 13,400. In 1970, women accounted for 9 percent of doctoral degrees awarded in science and engineering; in 1980, they accounted for 22 percent.

The percentages of women awarded doctorates increased in all S/E fields except the mathematical sciences. In 1980, 54 percent (2,100) of the doctorates earned by women were in the social sciences including psychology. By comparison, less than 30 percent (3,800) of doctorates received by men were in the social sciences. The proportion of women earning doctorates in engineering continued to be small. Although the number increased from 24 to 90 between 1970 and 1980, women accounted for only 3.6 percent of all 1980 doctorates awarded in this field.

Graduate Degree Attainment Rates

Graduate degree attainment rates are defined as S/E master's degrees expressed as a percent of S/E bachelor's degrees awarded 2 years earlier and S/E doctoral degrees expressed as a percent of S/E bachelor's degrees awarded 7 years earlier.

Graduate degree attainment rates vary considerably by sex (appendix table 58). The 1980 S/E master's degree attainment rate was 14.4 percent for women and 21.3 percent for men. For S/E doctorates, the rate differential for men and women has narrowed considerably since 1972. The rate for men in 1972 was 12.8 percent; by 1980, it had fallen to 6.3 percent. For women, the decline has been much less severe, falling less than a percentage point from 5.3 percent in 1972 to 4.5 percent in 1980.

Postdoctoral Appointments[5]

Along with the increasing number of women earning doctorates has been a corresponding increase in the number of women taking postdoctoral appointments. The number of women graduates taking these appointments rose nearly 80 percent between 1972 and 1978 (from 501 to 899) while the number of men dropped by 14 percent (from 3,750 to 3,207). Consequently, the proportion of all postdoctoral appointments held by women graduates increased from 12 to 22 percent. The largest increases in women postdoctorals were in fields where the rates of increase in doctorates earned have been greatest; biosciences (up 42 percent, from 325 to 460), psychology (up 142 percent, from 78 to 189), and social sciences (up almost 1,000 percent, from 12 to 128). The figures for men in these fields are quite different; biosciences (up 10 percent, from 1,292 to 1,420), psychology (up 25 percent, from 225 to 282), and social sciences (down 50 percent, from 216 to 106).[6]

An NSF-sponsored survey of 1978 doctorate recipients conducted by the National Academy of Sciences (NAS) addressed the primary reasons underlying decisions to take postdoctoral appointments. Women graduates in all fields of science and engineering were more likely to be influenced by geographic considerations than were men. Geographic considerations were considerably more important for married than single women—70 percent of the married women, compared to 33 percent of the single women, indicated that geographic limitations were an important factor. For married and single men, between 22 percent and 26 percent listed geographic limitations as an important factor in taking postdoctoral appointments.[7]

An NAS survey of 1972 doctoral recipients showed that women held postdoctoral appointments longer than men and more frequently prolonged their appointments because of difficulty in finding subsequent employment. This postdoctoral "holding pattern" was most apparent in the physical and life sciences. Differences were also observed between married and single women: married women were more likely to prolong their appointments because they could not secure the employment they preferred. On the other hand, married men were significantly less likely to prolong their appointments than single men.[8]

Mathematics and Science Training

Pre-college preparation

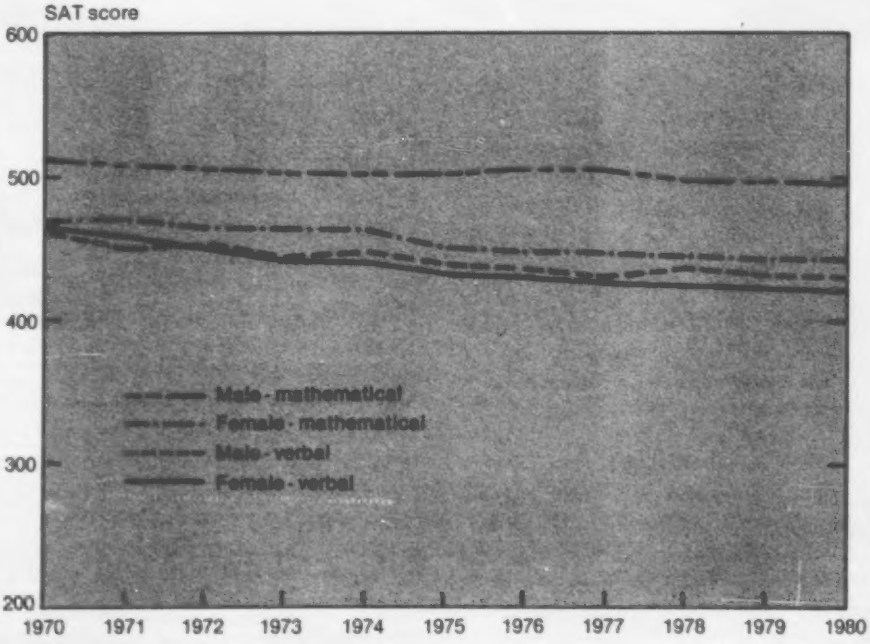
Mathematics—Outside of specific vocational programs, a major difference between males and females in high school course enrollment is that females take fewer mathematics courses than males. Several studies prepared by the National Assessment of Educational Progress have shown that through the 7th or 8th grades, during which time both sexes take the same mathematics courses, there are almost no differences in scores of boys and girls on tests of mathematical knowledge and skills.[9] However, by the 12th grade, a significant male advantage has emerged. At age 9, there is little difference between scores on the skill component of these tests, but girls outperform boys on knowledge exercises. By age 17, boys had considerably higher test scores than girls on both components (73 percent vs. 60 percent on the knowledge test and 71 percent vs. 58 percent on the skill test).[10] Many of these differences can be attributed to the fact that boys take more high school mathematics courses than girls.

According to a study by the National Center for Education Statistics[11], in 1980, about the same proportion of male and female high school seniors had taken Algebra I (about four-fifths), Algebra II (about one-half), and geometry (between one-half and three-fifths). However, the gap in participation began to widen for more advanced math courses. Of the males, 30 percent had taken trigonometry, compared with 22 percent of the females. For calculus, the proportions were 10 percent for males and 6 percent for females. Since the early 1970's, this differential has narrowed.[12] The National Institute of Education found that, in 1972, there was a 17 point differential in the number of male and female high school students taking 4 years of mathematics (39 percent vs. 22 percent). By 1978, the differential had narrowed to 4 points (31 percent vs. 27 percent).[13]

The SAT, widely used by colleges in admissions decisions, has a score range between 200 and 800. In 1980, females scored 48 points lower than males (443 vs. 491) on the mathematical portion of the SAT (appendix table 64). Since 1970, scores for both males and females in mathematics have declined 18 to 22 points (from 509 to 491 for males and from 465 to 443 for females) (figure 3-3). In 1980, males and females had roughly similar scores on the verbal portion of the SAT (428 vs. 420). Since 1970, SAT verbal scores have declined by approximately 40 points for both males and females (figure 3-3).

Science—In 1976-77, the National Assessment of Educational Progress conducted its third survey of the science achievement of American students aged 9, 13, and 17.[14] The overall percentages of female students who answered science questions correctly

Figure 3-3. Mean scores on the Scholastic Aptitude Test (SAT) for college-bound high school seniors by sex



SOURCE: Appendix table 64

were consistently below males in these age groups. At age 17, for example, the percentage of females answering questions correctly (51 percent) was 5 percentage points below the percentage for males (56 percent).

As in the case with mathematics, females tend to take less coursework in the sciences than males. A 1980 survey of college-bound seniors indicated that, in the biological sciences, similar proportions of males (33 percent) and females (35 percent) had taken 2 or more years of coursework. In the physical sciences, however, two-thirds of the males had studied physical science for 2 or more years, compared to about half of the females. Only 15 percent of the females, compared with 30 percent of the males, had studied physical sciences for 3 or more years by the end of high school.[15]

Undergraduate preparation

Women who majored in science or engineering at the undergraduate level had scores roughly similar to their male counterparts on the GRE in 1978-79.[16]

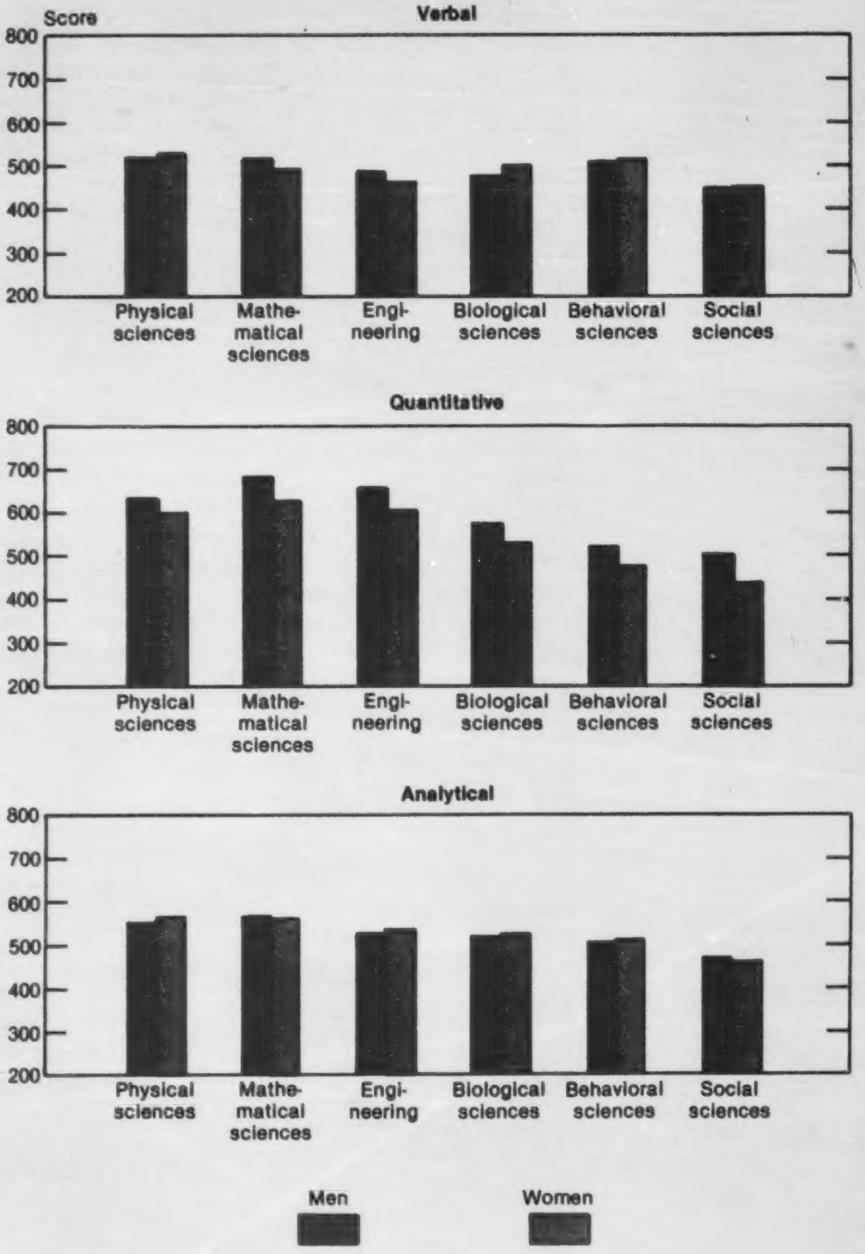
On the verbal section, women scored higher than men across all undergraduate S/E majors, with the exception of mathematical science (figure 3-4). For both sexes, the highest scores were recorded by those majoring in the physical sciences (534 for women and 514 for men).

On the quantitative section, men scored higher than women across the major S/E fields (figure 3-4). For both sexes, the highest quantitative scores were recorded by those majoring in the mathematical sciences (682 for men and 636 for women).

On the analytical portion of the test, the results were mixed by sex (figure 3-4). Women majoring in the physical or biological sciences or engineering scored slightly higher than men. The highest scores for both men and women were recorded for those who majored in mathematical science (568 and 565, respectively) (appendix table 62).

Test scores on the GRE suggest that women and men who major in science or engineering are equally qualified, educationally, to go on to graduate study. Differences between the sexes in specific fields do not vary by a standard deviation (i.e., scores for men and women are densely dispersed around the overall mean score for each field).

Figure 3-4. GRE scores by undergraduate major and sex: 1978/79



SOURCE: Appendix table 62

RACIAL MINORITIES

Earned Degrees in Science and Engineering

Blacks, Asians, and other racial minorities earn a small fraction of the degrees awarded in science and engineering (Appendix table 59). In 1979, blacks earned 6 percent of the S/E bachelor's degrees and less than 3 percent of the doctorates.[17] Comparatively, they constituted 12 percent of the 1976 high school graduates.[18] Asians represented only 1 percent of the 1976 high school graduates[19], but earned slightly over 2 percent of the S/E bachelor's degrees and over 4 percent of the S/E doctorates. Of the Asians who earned doctorates from U.S. universities, 84 percent were not U.S. citizens.

Blacks who earned S/E bachelor's degrees were concentrated in the social sciences and psychology. Two-thirds of the S/E bachelor's degrees earned by blacks in 1979 were in these fields. For whites, the comparable figure was 45 percent.

The number of blacks earning degrees in engineering has increased significantly since the early 1970's. Between 1972 and 1980, the number more than doubled, from almost 600 to over 1300.[20] Despite this increase, only 2 percent of the S/E degrees earned by blacks were in engineering.

Asians, on the other hand, tended to earn their degrees in engineering and the life sciences. Over one-fourth of the S/E bachelor's degrees awarded to Asians in 1979 were in engineering fields, and one-fourth were in the life sciences. Relatively few Asians (34 percent) compared to blacks (65 percent) earned degrees in psychology and the social sciences.

Differences in field also exist at advanced degree levels. Slightly more than three-fifths of the S/E master's and doctorates earned by blacks were in the social sciences and psychology, compared with 38 percent for whites (appendix table 59). Among Asians, 45 percent of those receiving master's degrees earned them in engineering; at the doctorate level, the proportion was 31 percent. A significant fraction of Asians also earned advanced degrees in the life sciences.

Postdoctoral Appointments

In 1979, blacks held less than 1 percent of the total S/E postdoctorates, while Asians held 11 percent (87 percent of the Asian postdoctorates were foreign born). The Asian share has increased from about 8 percent in 1973 to about 13 percent in 1979. Although the number of blacks in postdoctoral appointments doubled between 1973 and 1979 (31 to 66), their relative share has remained virtually constant (appendix table 61). Again, it should be noted that blacks are heavily concentrated in the social sciences—a discipline with historically few postdoctorates. About three-fifths of both whites and blacks with postdoctoral appointments and 45 percent of the Asians in 1979 were life scientists.

The number of minority S/E graduates taking postdoctoral appointments declined by 19 percent (from 234 to 190) between 1972 and 1978, while the numbers earning S/E doctorates increased by 21 percent (from 716 to 865). Among whites, the number taking postdoctoral appointments declined by 3 percent during this period, while the number earning degrees declined by 10 percent.[21] In 1972, 33 percent of the minorities receiving S/E doctorates took postdoctoral appointments; in 1978, the proportion was 22 percent. In all major fields except the social sciences, the proportion of minorities taking postdoctoral appointments fell, while the proportion for whites increased. The largest declines occurred in the physical and mathematical sciences, where 48 percent took postdoctorates in 1972, compared to 26 percent in 1978.[22]

An important reason for the decline in the number of minority postdoctorates may be the availability of alternative employment opportunities. For example, minority graduates generally have been more successful than others in obtaining offers of faculty positions. There is some concern, however, that the lack of postdoctoral experience may limit the career achievement of minority scientists, especially in fields such as bioscience, physics, and chemistry, in which such experience is generally regarded as valuable for careers in academic research.[23]

Mathematics and Science Training

Pre-college preparation

Mathematics—In 1978, the National Assessment of Educational Progress[24] found that the average scores of whites on tests designed to measure mathematical knowledge and skills were higher than those of blacks. The differences appear to increase with age. For example, at age 9, the gap between whites (68 percent) and blacks (55 percent) for mathematical knowledge was 13 percentage points. By age 13, the gap was 17 percentage points (70 percent for whites versus 53 percent for blacks). At age 17, the gap between whites and blacks was 18 percentage points for mathematical knowledge (74 percent vs. 56 percent) and 20 percentage points for mathematical skills (61 percent vs. 41 percent).[25]

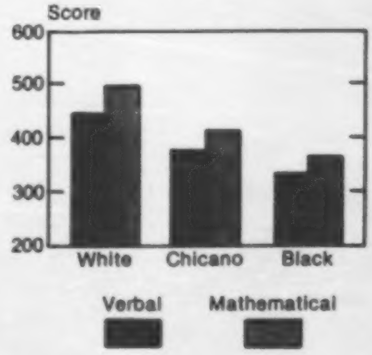
The scores of blacks on mathematical tests have increased over time. The scores of 9-year-old blacks increased between 1973 and 1978, while those of whites declined or remained constant. Among 13-year-olds, black test scores remained constant, while those of whites showed an overall decline. By age 17, scores for both blacks and whites showed declines between 1973 and 1978, but the gap that existed at age 13 remained relatively constant.[26]

As noted earlier, high school coursework has an impact on test scores. White high school students were more likely than blacks, on average, to take academic mathematics courses. In 1978, three-fourths of the 17-year-old whites had taken Algebra I, compared with 55 percent of the 17-year-old blacks. The percentages of 17-year-old whites and blacks who had taken geometry were 55 percent and 31 percent, respectively. For Algebra II, the differential between whites and blacks narrowed, with 38 percent of the whites and 24 percent of the blacks taking this subject.[27]

Over the period 1972-73 to 1976-77, scores of blacks on the SAT were an average of 119 points lower than the scores of whites on the verbal section and 134 points lower on the mathematics section.[28] For those taking the SAT in 1976-77, scores of whites were higher than scores of blacks on both the verbal (459 vs. 329) and mathematics sections (490 vs. 355) (figure 3-5).

Science—The scores of blacks on science tests between 1969 and 1977 were consistently lower than scores of whites. In 1977, the scores were 38 percent for blacks and 56 percent for whites.[29] For all races, the scores of 17-year-olds continued to decline. However, the scores of whites were higher than those of blacks in each of the three assessments conducted between 1969 and 1977.[30]

Figure 3-5. Scholastic Aptitude Test (SAT) scores by race: 1976/77



SOURCE: Appendix table 65

In science coursework in high school, about the same proportion of whites and blacks took physics (20 percent); however, 39 percent of the whites and only 28 percent of the blacks took chemistry.[31]

Undergraduate preparation

GRE scores of whites who majored in a science or engineering field at the undergraduate level were consistently higher than those of blacks in 1978-79 (appendix table 62).[32]

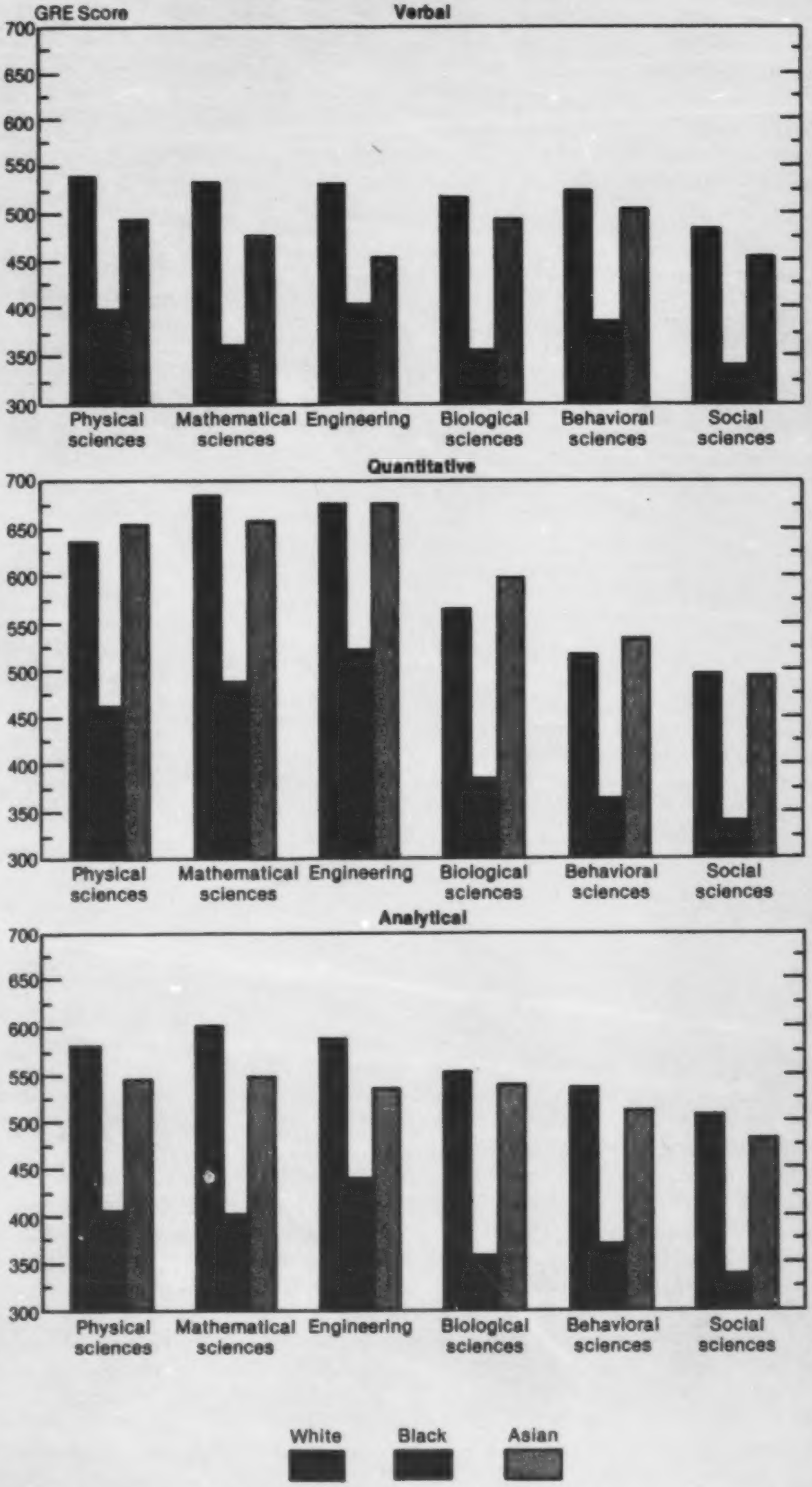
Scores on the verbal section were higher for whites than for blacks across all S/E fields. The highest score for whites was recorded for those who majored in the physical sciences (541), and the highest for blacks those who majored in engineering (403) (figure 3-6). The largest differential between scores of blacks and whites was found among those who majored in the mathematical sciences where the two races were separated by 1.5 to 2 standard deviations (537 for whites and 364 for blacks).

On the quantitative component of the GRE, blacks generally scored 1 standard deviation lower than whites in each of the major S/E fields (figure 3-6). For blacks, the highest score was recorded by those who majored in engineering (521). The highest score for whites was for those whose major was mathematical science (682)—the field which also showed the largest black/white differential (blacks scored 486).

On the analytical test, scores for whites were generally more than 1 standard deviation above those for blacks across all major fields (figure 3-6). As with the quantitative component, the highest score for blacks was for engineering majors (437), and the highest for whites was for mathematical science majors (602), where the black/white differential was again the highest (blacks scored 401).

Lower scores for blacks on tests of mathematics and science achievement are not a reflection of lack of inherent ability. These test scores can reflect a number of social, demographic, and economic factors. For example, a disproportionate number of black families are at lower economic levels. Thus, gross comparisons between whites and blacks can give a distorted picture of inherent ability because other variables, such as family income and education of parents, are not controlled.[33]

Figure 3-6. Mean scores on the Graduate Record Examination (GRE) by undergraduate field and race: 1978/79



SOURCE: Appendix table 62

HISPANICS

Earned Degrees in Science and Engineering

Although Hispanics are a diverse ethnic group, they are treated in the aggregate in this report because of data limitations.

In 1979, Hispanics earned about 10,300 bachelor's degrees in science and engineering, representing 3.2 percent of all S/E bachelor's degrees. This number was a substantial increase from the 6,700 (2 percent of total) earned in 1976. About 4 percent of high school graduates in 1976 were Hispanics.[34] About 55 percent of the Hispanics earned degrees in the social sciences and psychology, compared to 47 percent for all groups combined.

Hispanics earned almost 2 percent of the master's degrees awarded in science and engineering and about 1.4 percent of the S/E doctorates. At all three levels, Hispanics—compared to the national average—were somewhat more likely to earn their degrees in the social sciences and psychology (figure 3-7).

Differences in field of degree between Hispanics and non-Hispanics widened with the level of degree. For example, 5 percent of the Hispanics earning S/E bachelor's degrees and 7 percent of all S/E undergraduates received their degrees in the physical sciences. At the doctoral level, 12 percent of the degrees earned by Hispanics were in the physical sciences, compared to 18 percent awarded overall.

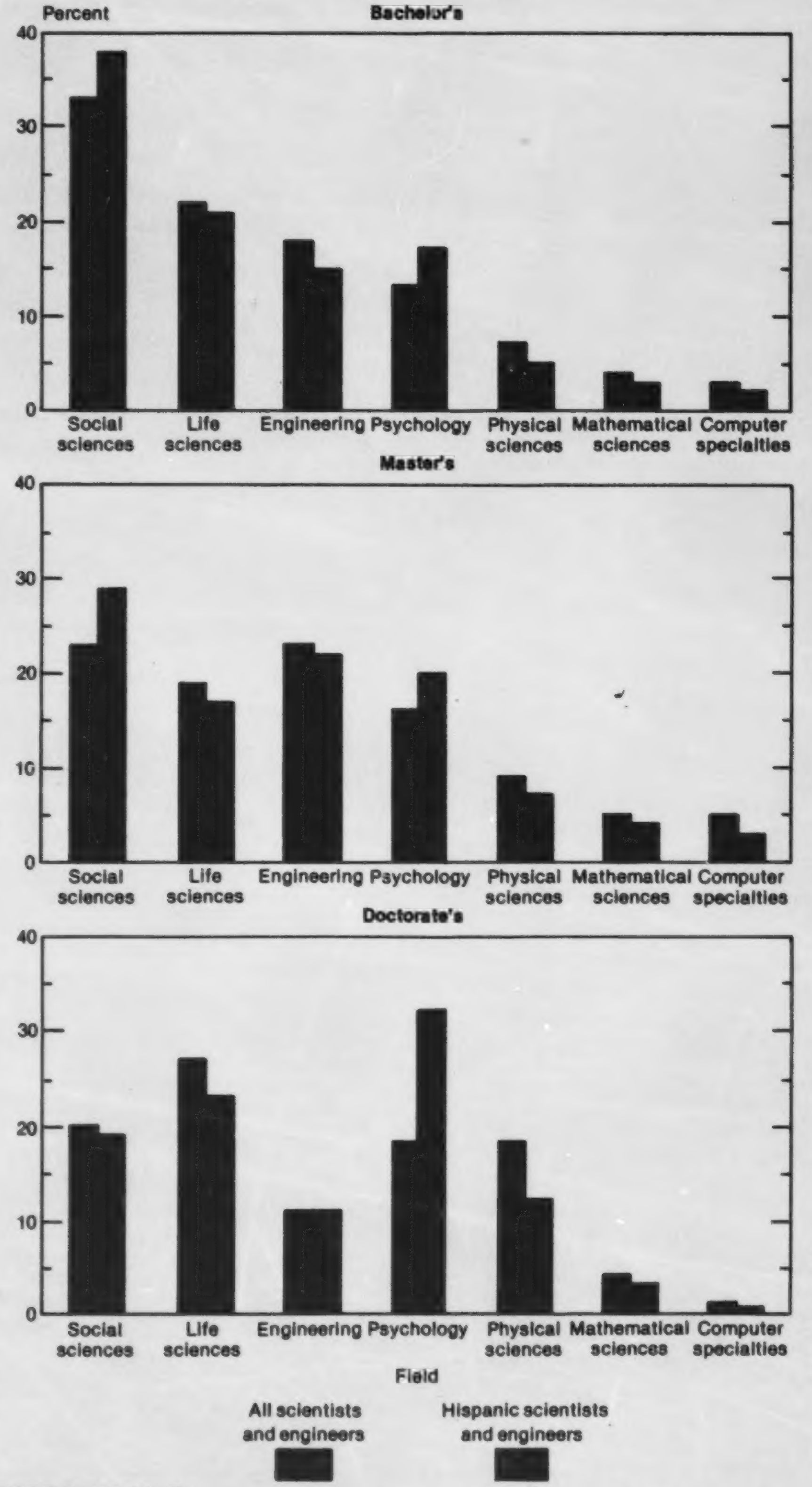
Mathematics and Science Training

Pre-college preparation

Mathematics—The National Assessment of Educational Progress found that, at age 17, the average scores of Hispanics were 12 points below the national average on tests of mathematical knowledge and skills; they scored 60 percent on tests of knowledge and 47 percent on skill tests.[35] The differences increased with age. At age 9, for example, Hispanics scored between 8 and 9 percentage points (35 percent on skill tests and 57 percent on knowledge tests) below the national average.[36]

Hispanics generally took fewer years of high school mathematics than all high school seniors. In 1980, 33 percent of all high school seniors, but only 27 percent of the Hispanics, reported taking 3 or more years of mathematics.[37]

Figure 3-7. Distribution of earned S/E degrees by degree level and field: total and Hispanics, 1978/79



SOURCE: Appendix table 59

SAT data are not available for all Hispanics. These data, however, are available for Chicanos.[38] For Chicanos taking the SAT in 1976-77, scores on the verbal portion were 75 points below those for non-Chicano whites (374 vs. 449). Chicanos scored 78 points lower on the mathematics portion (412 vs. 490) (figure 3-5).

Science—Hispanic students have tended to perform below the national average on science tests. At age 17, for example, Hispanics scored 11 percentage points below the national average of 54 percent.[39] Like the difference in mathematical achievement, the difference in science achievement between Hispanics and others increased with age. At age 9, for example, Hispanics scored 9 percentage points below the national average of 51 percent.

Hispanics also took significantly fewer years of high school science than did all high school seniors. Only 14 percent of the 1980 Hispanic high school seniors took 3 or more years of science; overall, 22 percent of the seniors took 3 or more years.[40]

Undergraduate preparation

On average, Hispanics who majored in science and engineering in college scored lower than the total group on the three components—verbal, quantitative, and analytical—of the GRE in 1978-79.[41] Of the three major groups classified as Hispanics—Mexican-Americans, Puerto Ricans, and Latin Americans—Puerto Ricans showed the lowest scores, 1.5 to 2 standard deviations below those for the total.

On the verbal component, the largest differential appeared for those who majored in mathematics at the undergraduate level. Puerto Ricans scored 375, while the overall score was 524.[42] Mexican-Americans and Latin Americans scored in the low to mid-400's.

Among Hispanics who majored in science and engineering at the undergraduate level, quantitative test scores were higher than scores on the verbal test. Although Mexican-Americans, Puerto Ricans, and Latin Americans scored lower than the overall average, those who majored in physical and mathematical sciences, or engineering showed average score differences of less than 1 standard deviation. In engineering, for example, the overall score was 666; Mexican-Americans scored 595; Puerto Ricans scored 583; and Latin Americans scored 624.

On the analytical test, scores were generally separated by 1 to 1.5 standard deviations. Scores of Latin Americans were much closer to overall averages than were scores of either Mexican-Americans or Puerto Ricans. For example, for those who majored in mathematical sciences, the overall score was 585; Latin Americans scored 530; Mexican-Americans scored 467; and Puerto Ricans scored 412.

REFERENCES

1. Educational Testing Service, *Guide to the Use of the Graduate Record Examination, 1981-82*, Princeton, N.J., pp. 9-10.

2. U.S. Department of Education, National Center for Education Statistics, *The Condition of Education 1981* Washington, p. 112.

3. George H. Brown, *Degree Awards To Women: 1979 Update*, Washington, U.S. Department of Education, National Center for Education Statistics, January 1981, p. 5.

4. Includes master's and doctoral degrees but excludes professional degrees such as law and medicine.

5. This section has been drawn primarily from National Academy of Sciences, *Postdoctoral Appointments and Disappointments*, Washington, 1981.

6. *Postdoctoral Appointments and Disappointments*, p. 148.

7. Ibid., p. 151.

8. Ibid., pp. 149 and 153.

9. National Commission for Employment Policy, *Increasing the Earnings of Disadvantaged Women*, Washington, January 1981, p. 47.

10. National Assessment of Educational Progress, *Mathematical Knowledge and Skills*, Report No. 09-MA-02, Denver, Colorado, National Institute of Education, 1970, pp. 42 and 68-70. Unless noted, information on mathematical achievement test scores are from this source.

11. U.S. Department of Education, National Center for Education Statistics, *High School and Beyond: A National Longitudinal Study for the 1980's* (prepublication edition), Washington, 1981, p. 9.

12. Susan F. Chipman and Veronica G. Thomas, *Women's Participation in Mathematics: Outlining the Problem*, National Institute of Education, August 1980.

13. J. M. Armstrong, *A National Assessment of Achievement and Participation in Mathematics*, Report No. 10-MA-60, National Institute of Education, 1979.

14. Unless otherwise noted, data on science achievement are from the National Assessment of Educational Progress, *Science Achievement in the Schools*, Report No. 08-S-01, Denver, Colorado, National Institute of Education, 1978, pp. 49-51, and unpublished data.

15. Admissions Testing Program of the College Board, Educational Testing Service, *National College-Bound Seniors 1980*, Princeton, N.J., p. 14.

16. All GRE test scores are from Cheryl L. Wild, *A Summary of Data Collected From Graduate Record Examinations Test-Takers During 1978-79*, Data Summary Report No. 4, Princeton, N.J., Educational Testing Service, 1980, pp. 76-81.

17. Data on earned degrees by race are not available for earlier years. Thus, an analysis of the number of degrees earned by the various racial/ethnic groups over time is not possible.

18. U.S. Department of Education, Office of Civil Rights, *Civil Rights Survey of Elementary and Secondary Schools*. While it would be more appropriate to use 1975 data, the racial/ethnic composition of high school graduates are only collected for even numbered years.

19. Ibid.

20. Engineering Manpower Commission, American Association of Engineering Societies, *Engineering and Technological Degrees 1980*, New York, November 1980.

21. This portion of the discussion on minorities holding postdoctoral appointments is from *Postdoctoral Appointments and Disappointments*.

22. *Postdoctoral Appointments and Disappointments*, pp. 142-146.

23. Ibid., pp. 143 and 146.

24. National Assessment of Educational Progress, *Mathematical Knowledge and Skills*, Report No. 09-MA-02, April, 1979; *Changes in Mathematical Achievement 1973-1978*, Report No. 09-MA-01, August, 1979; *Mathematical Technical Report: Summary Volume*, Report No. 09-MA-21, April, 1980; Denver, Colorado, National Institute of Education.

25. *Mathematical Knowledge and Skills*, pp. 68-70.

26. *Changes in Mathematical Achievement 1973-78*, p. 22.

27. *Mathematical Knowledge and Skills*, p. 45.

28. Robert L. Jacobsen, "Blacks Lag in SAT Scores," *The Chronicle of Higher Education*, Vol. XIX, No. 16 (1980), p. 5.

29. Achievement in science was assessed for three age groups, ages 9, 13, and 17, during three different time frames, 1969-70, 1972-73, and 1976-77. The tests were designed to establish how students "respond to science exercises, rather than the level of individual students." National Assessment of Educational Progress, *Three National Assessments of Science; Changes in Achievement, 1969-77*, Report No. 08-S-00, for the National Center for Education Statistics, June 1978.

30. Ibid., p. 14.

31. *High School and Beyond*, p. 9.

32. All test scores are from *A Summary of Data Collected From Graduate Record Examination Test-Takers*, pp. 76-81.

33. National Assessment of Educational Progress, *Science Achievement in the Schools*, Report No. 08-S-01, Denver, Colorado, National Institute of Education, 1978, p. 19.

34. *Civil Rights Survey of Elementary and Secondary Schools*.

35. *Mathematical Knowledge and Skills*, pp. 68-70.

36. Ibid.

37. U.S. Department of Education, *Digest of Education Statistics, 1981* (pre-publication copy).

38. Of those Hispanics taking the SAT in 1978-79, almost two-thirds were Mexican-American (Chicano). The remainder was Puerto Rican. *National College-Bound Seniors*, 1980, p. 15.

39. *Science Achievement in the Schools* and unpublished data.

40. *Digest of Education Statistics, 1981.*

41. *A Summary of Data Collected From Graduate Record Examinations Test-Takers*, pp. 76-81. Unless otherwise stated, data on Hispanic test scores on the GRE are from this source.

42. It should be noted that English was reported as the best language for over 90 percent of the whites, blacks, and Mexican-Americans, 86 percent of the Asians, 76 percent of the Latin Americans, and only 36 percent of the Puerto Ricans among the 1978-79 GRE test-takers. *A Summary of Data Collected From Graduate Record Examinations Test-Takers*, p. 74.

Technical Notes

CONCEPTS AND DEFINITIONS

The National Science Foundation (NSF) publishes estimates of the number, type of employer, work activity, and other economic and demographic characteristics of persons who meet its particular definition of a scientist or engineer. Broadly speaking, a person is considered a scientist or engineer if at least two of the following critieria are met:

1. Highest degree held in a science (including social sciences) or engineering field;
2. Employed in a science or engineering occupation; or
3. Professional identification as a scientist or engineer based on total education and work experience.

Composite Estimates

The composite estimates which depict national totals are developed as part of the NSF Scientific and Technical Personnel Data System (STPDS). The system draws primarily from three data sources, each designed to measure the characteristics of a particular subpopulation:

- *The Experienced Sample of Scientists and Engineers*—consisting of about 50,000 individuals (3.5 percent sample), was drawn from scientists and engineers who were in the labor force at the time of the 1970 decennial census. Information on this group was collected for NSF in 1972, 1974, 1976, and 1978 by the Bureau of the Census.
- *The New Entrants Surveys*—are designed to measure the magnitude and characteristics of scientists and engineers who have entered the S/E labor force since the 1970 decennial census. Samples (about 2 percent) of the graduating classes of 1971, 1972, and 1973 were surveyed in 1974 by the Laboratory for Research in Higher Education, University of California, Los Angeles. Westat, Inc., sampled the classes of 1974 and 1975 (about 2 percent) in 1976, the classes of 1972 and 1976 (about 2 percent) in 1978, and the classes of 1978 and 1979 (about 2 percent) in 1980.
- *The Roster of Doctoral Scientists and Engineers*—maintained by the Commission on Human Resources, National Research Council, National Academy of Sciences, consists of all known doctoral scientists and engineers in the United States since 1930. The roster serves as a panel from which a sample of 60,000 scientists and engineers (20 percent) covering the years 1936-78 were selected to provide data on the doctoral population of the Nation.

Occupation/Field of Science or Engineering

Data on field of science or engineering are derived from responses to questions on the various surveys. Fields are classified as follows:

- *Physical Sciences*—Chemistry, physics, astronomy, and other physical sciences, including metallurgy
- *Environmental Sciences*—Earth, atmospheric, and oceanographic sciences, including geophysics, geology, seismology, meteorology
- *Life Sciences*—Agricultural, biological, and medical sciences (excluding those primarily engaged in patient care)
- *Mathematical Sciences*—Mathematics and statistics
- *Social Sciences*—Economics (including agricultural economics), sociology, anthropology, and all other social sciences
- Psychology
- Computer sciences
- Engineering

Data on field of employment are derived from responses to questions that request—based on employment specialties lists included with the questionnaire—the name of the specialty most closely related to the respondent's principal employment. Those who selected an employment specialty not in science or engineering are assigned to a field of science or engineering based on the field of their degree and for those with less than a doctorate, their professional self-identification.

Primary Work Activity

Data presented on the work activities of scientists and engineers represent their *primary* work activities. The data are derived from responses to a series of questions on the survey instruments that ask individuals: (1) to specify their primary work activity, and (2) to provide a percentage distribution of their work time among 10 to 15 listed activities.

Other Variables

Information on other economic and demographic variables, such as type of employer, race, and sex are based on individual responses to survey questions. The various survey instruments used by the Division of Science Resources Studies are similar and are shown in *A Guide to NSF Science Resources Data* (see "Data Source Publications" below).

Reliability of Scientist and Engineer Estimates

Since the data on scientists and engineers are derived from sample surveys, the estimates are subject to both sampling and nonsampling errors.

The sample used for a survey is only one of a large number of possible samples of the same size that could have been selected using the same sample design. Even if the same questionnaire and instructions were used, the estimates from the samples would differ from each other. The deviation of a sample estimate from the average of all possible samples is defined as sampling error. The standard error of a survey estimate attempts to provide a measure of this variation and thus is a measure of the precision with which an estimate from the sample approximates the average results of all possible samples. Technical information on the computation of the standard errors for the major S/E data series used in this report can be found in the appropriate publications listed at the end of this section. Selected tables of standard errors for the various surveys are contained on the following pages and listed below.

Survey	*Table*
1978 Composite estimates of total scientists and engineers	1
1979 Doctoral scientists and engineers	2
1978 Experienced scientists and engineers	3
1980 Recent S/E graduates[1]	4,5

The sampling errors shown were generated on the basis of approximations and must, therefore, be considered estimates rather than precise measurements. The standard error may be used to construct a confidence interval about a given estimate. Thus, when the reported standard error is added to and subtracted from an estimate, the resulting range of values reflects an interval within which about 68 percent of all sample estimates, surveyed under the same conditions, will fall. Intervals reflecting a higher confidence level may be constructed by increasing the number of standard errors for a given estimate. Thus, ±1.6 standard errors defines a 90 percent confidence interval; ±2 standard errors, a 95 percent confidence interval.

Nonsampling errors can be attributed to many sources: inability to obtain information about all cases, difficulties of definition, differences in the interpretation of questions, inability or unwillingness on the part of respondents to provide correct information, mistakes in recording or coding the information, and other errors of collection, response, processing, coverage, and imputation. Nonsampling errors are not unique to sample surveys since they can, and do, occur in complete canvasses as well. No systematic attempt has been made to identify or approximate the magnitude of the nonsampling errors associated with the estimates of scientists and engineers presented in this report.

Statistical Measures

Labor Force Participation Rates—The labor force is defined as those employed and those seeking employment. The labor force participation rate (LFPR) is the ratio of those employed (E) and those unemployed but seeking employment (U) to the population (P).

$$\mathrm{LFPR} = \frac{E + U}{P}$$

S/E Utilization Rates—The S/E utilization rate (ES/E) measures the ratio of those holding jobs in science or engineering (S/E) to the total science and engineering labor force (LF), which includes those scientists and engineers employed in any job and those seeking employment.

$$\mathrm{ES/E} = \frac{S/E}{LF}$$

S/E Employment Rates—The S/E employment rate (es/e) measures the ratio of those holding jobs in science or engineering (S/E) to the total employment (E) of scientists and engineers, which includes those holding nonscience and nonengineering jobs.

$$\mathrm{es/e} = \frac{S/E}{E}$$

Unemployment Rates—The unemployment rate (UE/R) shows the ratio of those who are unemployed but seeking employment to the total labor force (LF = E + U).

$$\mathrm{UE/R} = \frac{U}{E + U}$$

DATA SOURCE PUBLICATIONS

Details on survey methods, coverage, concepts, definitions, and reliability of the data used in this report are contained in the following publications of the National Science Foundation:

U.S. Scientists and Engineers: 1978 (Detailed Statistical Tables) (NSF 80-304)

U.S. Scientists and Engineers: 1976 (Detailed Statistical Tables) (NSF 79-305)

Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (Detailed Statistical Tables) (NSF 80-323)

Characteristics of Doctoral Scientists and Engineers in the United States: 1977 (Detailed Statistical Tables) (NSF 79-306)

Characteristics of Experienced Scientists and Engineers: 1978 (Detailed Statistical Tables) (NSF 79-322)

For a brief description of each survey and copies of the survey instruments, see *A Guide to NSF Science Resources Data*, available from the Editorial and Inquiries Unit, Division of Science Resources Studies (Rm. L-611), National Science Foundation, Washington, D.C. 20550.

---

[1] In this report sampling errors for recent S/E graduates are adapted from those presented in Westat, Inc. *Methodological Approach to 1979/80 New Entrants Surveys*, Rockville, Maryland, May 1981, where the standard errors reflect the errors associated with estimates of one graduating cohort. Since the data presented herein reflect the *combined* 1978 and 1979 graduating cohorts, the standard errors have been recalculated by assuming a doubling in sample size. The net effect of this process is a reduction of about 30 percent in the size of the standard error.

Table 1. Standard errors for composite estimates of total scientists and engineers: 1978

Size of estimate	Total scientists and engineers	Physical scientists	Mathematical scientists	Computer specialists	Environmental scientists	Engineers	Life scientists	Psychologists	Social scientists
100	25	45	60	40	55	75	75	60	110
200	45	80	75	50	80	95	95	80	160
500	90	120	120	130	120	150	150	120	250
700	120	140	140	150	150	180	180	150	290
1,000	170	170	160	180	160	220	210	160	350
2,500	380	270	240	250	260	340	330	240	550
5,000	610	380	330	340	340	490	470	320	780
10,000	1,100	500	470	480	410	670	640	430	1,100
25,000	2,300	730	740	770	640	1,000	930	560	1,650
50,000	3,800	1,050	1,050	1,150	910	1,250	1,100	1,000	2,150
75,000	5,000	1,300	1,250	1,300	1,100	1,550	1,300	1,350	2,500
80,000	5,100	1,350	1,350	1,350	1,350	1,600	1,400	1,400	2,550
100,000	5,450	1,500	1,550	1,500		1,750	1,600	1,600	2,700
125,000	6,500	1,900		1,550		1,950	1,750	1,700	2,900
150,000	6,550	2,300		1,600		2,150	2,000		3,050
175,000	6,750	2,600		1,750		2,300	2,250		3,350
200,000	6,950	2,900		1,900		2,450	2,450		3,600
225,000	7,650	3,200		2,050		2,600	2,600		
250,000	8,350	3,500		2,200		2,700	2,900		
275,000	8,450					2,850	3,000		
300,000	8,550					2,950	3,300		
400,000	9,000					3,350			
500,000	9,400					3,650			
600,000	10,200					3,950			
700,000	11,100					4,150			
800,000	12,200					4,200			
900,000	13,100					4,250			
1,000,000	13,500					4,300			
1,200,000	14,700					4,450			
1,300,000	15,200					4,500			
1,500,000	16,400								
2,000,000	20,700								
2,500,000	25,800								
2,700,000	26,300								

Source: National Science Foundation

Table 2. Standard errors for doctoral scientists and engineers: 1979

Total population

Size of estimate	Estimated sampling error	Base of percent	Estimated percent 1/99	2/98	5/95	10/90	25/75	50
100	35	500	1.6	2.2	3.5	4.9	7.0	8.1
200	50	1,000	1.2	1.6	2.5	3.5	5.0	5.7
500	80	2,000	.8	1.2	1.8	2.4	3.5	4.1
1,000	120	5,000	.5	.7	1.1	1.5	2.2	2.6
2,000	160	10,000	.4	.5	.8	1.1	1.6	1.8
5,000	260	15,000	.3	.4	.7	.9	1.3	1.5
10,000	360	20,000	.2	.4	.5	.8	1.1	1.3
15,000	430	30,000	.2	.3	.4	.6	.9	1.0
20,000	500	40,000	.2	.2	.4	.5	.8	.9
30,000	600	50,000	.2	.2	.4	.5	.7	.8
40,000	680	75,000	.1	.2	.3	.4	.5	.7
50,000	750	100,000	.1	.2	.2	.4	.5	.5
75,000	870	150,000	.1	.1	.2	.3	.4	.5
100,000	960	200,000	.1	.1	.2	.2	.4	.4
150,000	1,050	250,000	.1	.1	.2	.2	.3	.4
200,000	1,000	275,000	.1	.1	.1	.2	.3	.4
250,000	900	300,000	.1	.1	.1	.2	.3	.3
300,000	620	325,000	.1	.1	.1	.2	.3	.3

Employed women

Size of estimate	Estimated sampling error	Base of percent	Estimated percent 1/99	2/98	5/95	10/90	25/75	50
100	20	500	1.0	1.4	2.1	2.9	4.2	4.9
200	30	1,000	.7	1.0	1.5	2.1	3.0	3.5
500	50	2,000	.5	.7	1.1	1.5	2.1	2.4
1,000	70	5,000	.3	.4	.7	.9	1.3	1.5
2,000	95	10,000	.2	.3	.5	.7	.9	1.1
5,000	140	15,000	.2	.2	.4	.5	.8	.9
10,000	180	20,000	.2	.2	.3	.5	.7	.8
15,000	200	25,000	.1	.2	.3	.4	.6	.7
20,000	300	30,000	.1	.2	.3	.4	.5	.6
30,000	120							

Employed by field

Field	Size of estimate 100	200	500	1,000	2,000	5,000	10,000	15,000	20,000	30,000	40,000	50,000	60,000	70,000
Physical scientists	40	55	90	125	175	270	360	420	460	490	460	370		
Mathematical scientists	30	45	70	95	130	180	190							
Computer specialists	35	50	80	110	140	130								
Environmental scientists	30	45	70	95	130	180	180							
Engineers	50	70	110	160	220	340	450	520	560	560	460			
Life scientists	30	45	70	95	140	210	290	340	380	420	430	420	380	290
Psychologists	40	55	85	120	160	250	320	360	370	300				
Social scientists	40	60	95	130	180	280	380	430	460	450	350			

Source: National Science Foundation

Table 3. Standard errors for experienced[1] scientists and engineers: 1978

Size of estimate	Total all fields	Physical scientists	Mathematical scientists	Computer specialists	Environmental scientists	Engineers	Life scientists	Psychologists	Social scientists
100	70	50	50	60	50	70	60	60	70
200	90	80	70	80	70	100	80	80	100
500	150	120	120	130	110	150	130	120	150
700	170	140	140	150	130	180	150	150	180
1,000	210	170	160	180	150	220	180	170	220
2,500	330	270	260	290	240	340	280	270	340
5,000	400	390	360	410	340	490	400	380	490
10,000	650	550	500	580	480	690	570	510	700
25,000	1,030	880	740	940	770	1,090	900	680	1,150
50,000	1,440	1,260	910	1,380	1,110	1,530	1,270	550	1,730
75,000	1,760	1,570				1,870	1,550		
100,000	2,010	1,840				2,150			
150,000	2,430	2,310				2,610			
200,000	2,760					2,990			
250,000	3,030					3,310			
300,000	3,270					3,590			
400,000	3,640					4,080			
500,000	3,910					4,480			
600,000	4,110					4,810			
700,000	4,240					5,100			
800,000	4,310								
900,000	4,330								
1,000,000	4,280								

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

Source: National Science Foundation

Table 4. Generalized standard errors for combined 1978 and 1979 S/E bachelor's degree recipients: 1980

Size of estimate	Total all fields	Physical scientists	Mathematical scientists	Computer specialists	Environmental scientists	Engineers	Life scientists	Psychologists	Social scientists
100	85	65	75	80	95	65	85	100	120
200	120	95	100	110	140	95	100	140	170
300	140	120	130	140	160	120	150	180	210
400	170	130	150	160	190	130	170	200	240
500	190	150	160	180	210	150	190	230	270
750	230	180	200	210	250	180	230	280	320
1,000	260	210	230	240	290	210	270	320	370
2,000	320	280	300	320	390	290	380	440	520
3,000	370	340	360	350	440	350	460	540	640
4,000	460	370	390	360	470	410	530	610	730
5,000	520	400	410	350	480	450	590	680	800
6,000	640	420	410	320	470	490	640	730	880
7,000	690	430	410	240	440	520	690	780	950
8,000	740	440	400		390	550	730	820	1,000
9,000	780	440	370		290	580	770	860	1,050
10,000	800	430	320			610	800	890	1,100
15,000	1,000	280				700	950	1,000	1,300
20,000	1,150					770	1,050	1,050	1,450
30,000	1,350					810	1,150	990	1,550
40,000	1,550					760	1,200	620	1,550
50,000	1,700					600	1,150		1,440
60,000	1,850						1,000		1,150
70,000	1,950						720		300
80,000	2,000								
90,000	2,100								
100,000	2,150								

Source: National Science Foundation

Table 5. Generalized standard errors for combined 1978 and 1979 S/E master's degree recipients: 1980

Size of estimate	Total all fields	Physical scientists	Mathematical scientists	Computer specialists	Environmental scientists	Engineers	Life scientists	Psychologists	Social scientists
100	55	50	65	65	65	50	55	70	65
200	80	70	90	90	95	70	80	100	95
300	100	85	110	110	110	85	95	120	110
400	110	95	120	120	130	100	110	140	130
500	130	110	130	130	140	110	120	150	140
750	150	120	150	160	160	140	150	190	170
1,000	180	140	170	170	170	160	170	210	200
1,500	220	150	180	180	170	190	200	250	230
2,000	250	150	180	170	150	210	230	280	250
3,000	300	110	90	45		250	260	310	270
4,000	340					280	280	320	270
5,000	380					300	300	310	240
6,000	410					310	300	280	170
7,000	440					320	290	220	
8,000	470					330	270	75	
9,000	490					330	240		
10,000	510					320	190		
15,000	590					190			
20,000	640								
30,000	660								
40,000	590								
50,000	380								

Source: National Science Foundation

APPENDIX TABLES

Number

1 Scientists and engineers by field, sex, and labor force status: 1974, 1976, and 1978 49

2 Scientists and engineers by field, race, and labor force status: 1974, 1976, and 1978 50

3a Scientists and engineers by field, sex, and labor force status: 1978 51

3b Scientists and engineers by field, race, and labor force status: 1978 52

4 Scientists and engineers by field, sex, and employment status: 1974, 1976, and 1978 53

5 Scientists and engineers by field, race, and employment status: 1974, 1976, and 1978 54

6a Scientists and engineers by field, sex, and employment status: 1978 55

6b Scientists and engineers by field, race, and employment status: 1978 56

7 Doctoral scientists and engineers by field, sex, and labor force status: 1973, 1977, and 1979 57

8 Doctoral scientists and engineers by field, race, and labor force status: 1973, 1977, and 1979 58

9a Doctoral scientists and engineers by field, sex, and labor force status: 1979 59

9b Doctoral scientists and engineers by field, race, and labor force status: 1979 60

10 Doctoral scientists and engineers by field, sex, and employment status: 1973, 1977, and 1979 64

11 Doctoral scientists and engineers by field, race, and employment status: 1973, 1977, and 1979 65

12a Doctoral scientists and engineers by field, sex, and employment status: 1979 66

12b Doctoral scientists and engineers by field, race, and employment status: 1979 67

13 Doctoral women scientists and engineers by field, race, and labor force status: 1973, 1977, and 1979 71

14 Doctoral women scientists and engineers by field, race, and employment status: 1973, 1977, and 1979 72

15 Women scientists and engineers by field and race: 1978 73

16 Experienced scientists and engineers by field, race, and S/E employment status: 1978 74

17 Scientists and engineers by field, sex, and primary work activity: 1974, 1976, and 1978 75

18 Scientists and engineers by field, sex, and primary work activity: 1978 76

19 Doctoral scientists and engineers by field, sex, and primary work activity: 1973, 1977, and 1979 77

20 Doctoral scientists and engineers by field, sex, and primary work activity: 1979 78

21 Doctoral scientists and engineers by field, race, and primary work activity: 1973, 1977, and 1979 79

22 Doctoral scientists and engineers by field, race, and primary work activity: 1979 82

23 Experienced scientists and engineers by field, race, and primary work activity: 1978 83

24 Scientists and engineers by field, sex, and type of employer: 1974, 1976, and 1978 84

25 Scientists and engineers by field, sex, and type of employer: 1978 85

26 Doctoral scientists and engineers by field, sex, and type of employer: 1973, 1977, and 1979 86

27 Doctoral scientists and engineers by field, sex, and type of employer: 1979 87

28 Doctoral scientists and engineers by field, race, and type of employer: 1973, 1977, and 1979 88

29 Doctoral scientists and engineers by field, race, and type of employer: 1979 89

30 Experienced scientists and engineers by field, race, and type of employer: 1978 90

31 Experienced and doctoral scientists and engineers by field, sex, and full-time/part-time status: 1978 and 1979 91

32 Experienced and doctoral scientists and engineers by field, race, and full-time/part-time status: 1978 and 1979 92

33 Employed scientists and engineers by field, sex, and age: 1978 93

34 Employed doctoral scientists and engineers by field, race, and age: 1979 94

35 Doctoral scientists and engineers by field, sex, and age: 1979 ... 95

36 Characteristics of doctoral scientists and engineers by Hispanic origin: 1979 ... 96

37 Scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and sex: 1978 ... 97

38 Scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and race: 1978 ... 98

39 Doctoral scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and sex: 1979 ... 99

40 Doctoral scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and race: 1979 ... 100

41 Doctoral women scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and race: 1979 ... 101

42 Experienced scientists and engineers by field, sex, race, and median annual salary: 1978 ... 102

43 Doctoral scientists and engineers by field, sex, race, and median annual salary: 1979 ... 103

44 Percent distribution of experienced and doctoral scientists and engineers by field, sex, and reason for non-S/E employment: 1978 and 1979 ... 104

45 Percent distribution of experienced and doctoral scientists and engineers by field, race, and reason for non-S/E employment: 1978 and 1979 ... 105

46 Recent science and engineering bachelor's degree recipients by field, sex, and labor force status: 1978 and 1979 in 1980 ... 106

47 Recent science and engineering master's degree recipients by field, sex, and labor force status: 1978 and 1979 in 1980 ... 107

48 Recent science and engineering bachelor's degree recipients by field, race, and labor force status: 1978 and 1979 in 1980 ... 108

49 Recent science and engineering master's degree recipients by field, race, and labor force status: 1978 and 1979 in 1980 ... 109

50 Recent science and engineering degree recipients by field, sex, degree level, labor force participation rates, science and engineering utilization rates, and unemployment rates: 1978 and 1979 in 1980 ... 110

51 Recent science and engineering degree recipients by field, race, degree level, labor force participation rates, science and engineering utilization rates, and unemployment rates: 1978 and 1979 in 1980 ... 111

52 Median annual salaries of recent science and engineering degree recipients by field, sex, race, and degree level: 1978 and 1979 in 1980 ... 112

53 Percent distribution of recent science and engineering degree recipients by field, sex, degree level, and reason for non-S/E employment: 1978 and 1979 in 1980 ... 113

54 Percent distribution of recent science and engineering degree recipients by field, race, degree level, and reason for non-S/E employment: 1978 and 1979 in 1980 ... 114

55 Science and engineering bachelor's and first-professional degree recipients by field and sex: 1970-80 ... 115

56 Science and engineering master's degree recipients by field and sex: 1970-80 ... 116

57 Science and engineering doctorate recipients by field and sex: 1970-80 ... 117

58 Graduate degree attainment rates by sex: 1972-80 ... 118

59 Science and engineering earned degrees by field, race, and degree level: 1978/79 ... 119

60 Postdoctorates in science and engineering by field and sex: 1973, 1977, and 1979 ... 120

61 Postdoctorates in science and engineering by field and race: 1973, 1977, and 1979 ... 121

62 Graduate Record Examination (GRE) scores by sex, race, and undergraduate major: 1978/79 ... 122

63 Graduate Record Examination (GRE) scores by undergraduate major and Hispanic origin: 1978/79 ... 123

64 Scholastic Aptitude Test (SAT) score averages for college-bound seniors by sex: 1970-80 ... 124

65 Scholastic Aptitude Test (SAT) scores for college-bound seniors by race: 1976/77 ... 124

Appendix table 1.—Scientists and engineers by field, sex, and labor force status: 1974, 1976, and 1978

Field and sex	Total			Labor force			Outside labor force		
	1974	1976	1978	1974	1976	1978	1974	1976	1978
All fields	2,481,800	2,705,800	2,741,400	2,288,000	2,451,700	2,507,600	193,800	254,100	235,800
Men	2,265,000	2,455,800	2,475,300	2,104,700	2,240,000	2,270,400	160,300	215,800	204,900
Women	216,800	250,000	266,100	183,300	211,700	237,200	33,500	38,300	28,900
Physical scientists	247,900	280,600	254,600	206,500	237,200	216,700	41,400	43,300	37,900
Men	227,200	254,100	231,800	189,900	215,800	200,700	37,300	38,300	31,100
Women	20,700	26,500	22,800	16,600	21,500	16,000	4,100	5,100	6,800
Mathematical scientists	101,000	110,200	107,800	84,500	92,200	89,800	16,500	18,000	18,000
Men	81,000	87,200	88,000	70,600	76,000	71,800	10,400	11,200	16,200
Women	20,000	22,900	19,800	13,900	16,200	18,000	6,100	6,800	1,800
Computer specialists	170,000	179,900	237,500	167,100	173,500	234,600	2,900	6,400	2,900
Men	135,400	143,500	194,800	135,400	139,500	193,900	(1)	4,000	900
Women	34,600	36,400	42,700	31,700	34,000	40,600	2,900	2,400	2,100
Environmental scientists	79,000	85,700	80,800	71,500	77,400	73,900	7,500	8,300	6,900
Men	73,700	79,300	72,200	67,100	73,000	66,200	6,600	6,300	6,000
Women	5,200	6,400	8,600	4,400	4,400	7,800	900	2,000	900
Engineers	1,291,600	1,375,200	1,396,400	1,228,600	1,268,000	1,285,000	63,000	107,200	111,300
Men	1,284,900	1,366,900	1,374,600	1,224,200	1,261,000	1,264,500	60,700	105,900	110,100
Women	6,700	8,300	21,700	4,400	7,000	20,500	2,300	1,300	1,200
Life scientists	266,000	314,100	327,600	243,400	286,300	295,800	22,600	27,800	31,800
Men	214,100	253,300	255,400	197,400	232,700	231,500	16,700	20,600	23,900
Women	51,900	60,800	72,200	46,000	53,700	64,300	5,900	7,200	7,900
Psychologists	109,300	122,900	131,700	94,000	105,700	123,200	15,300	17,200	8,500
Men	84,200	92,300	95,700	73,000	80,000	91,100	11,200	12,300	4,600
Women	25,100	30,700	36,000	21,000	25,700	32,100	4,100	4,900	3,900
Social scientists	217,000	237,200	205,100	192,400	211,400	188,500	24,600	25,600	16,600
Men	164,000	179,200	162,800	147,100	162,100	150,600	16,900	17,100	12,200
Women	53,000	58,000	42,200	45,300	49,300	37,800	7,700	8,600	4,400

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976-78).

Appendix table 2.—Scientists and engineers by field, race, and labor force status: 1974, 1976, and 1978

Field	Total					Labor force					Outside labor force				
	Total	White	Black	Asian	Other[1]	Total	White	Black	Asian	Other	Total	White	Black	Asian	Other[1]
1974															
All fields	2,481,800	2,375,600	38,500	43,900	23,800	2,288,000	2,188,500	35,500	41,200	22,800	193,800	187,100	3,000	2,700	1,000
Physical scientists	247,900	235,400	4,100	6,200	2,200	206,500	195,000	4,100	6,000	1,400	41,400	40,400	(2)	200	800
Mathematical scientists	101,000	96,700	2,500	1,500	400	84,500	80,600	2,200	1,300	400	16,500	16,100	300	200	(2)
Computer specialists	170,000	162,500	3,300	3,500	700	167,100	160,000	3,000	3,400	700	2,900	2,500	300	100	(2)
Environmental scientists	79,000	77,300	200	700	700	71,500	70,000	200	700	600	7,500	7,300	(2)	(2)	100
Engineers	1,291,600	1,246,700	11,800	22,300	10,800	1,228,600	1,184,900	10,900	22,000	10,800	63,000	61,800	900	300	(2)
Life scientists	266,000	255,700	3,200	3,700	3,400	243,400	233,900	2,700	3,400	3,400	22,600	21,800	500	300	(2)
Psychologists	109,300	103,500	1,800	3,000	1,000	94,000	88,800	1,700	2,500	1,000	15,300	14,700	100	500	(2)
Social scientists	217,000	197,800	11,600	3,000	4,600	192,400	175,400	10,700	1,900	4,400	24,600	22,400	900	1,100	200
1976															
All fields	2,705,800	2,593,600	40,400	45,400	26,400	2,451,700	2,348,200	36,000	42,600	24,800	254,100	245,400	4,400	2,800	1,600
Physical scientists	280,600	266,300	4,400	5,900	4,000	237,200	224,800	3,400	5,600	3,600	43,300	41,500	1,000	300	500
Mathematical scientists	110,200	105,300	2,700	1,600	500	92,200	88,000	2,400	1,200	500	18,000	17,300	300	400	(2)
Computer specialists	179,900	171,800	3,700	3,700	800	173,500	165,400	3,700	3,600	800	6,400	6,400	(2)	(2)	(2)
Environmental scientists	85,700	84,600	100	500	500	77,400	76,300	100	500	500	8,300	8,300	(2)	(2)	(2)
Engineers	1,375,200	1,327,300	12,600	23,000	12,400	1,268,000	1,222,400	12,200	21,400	12,100	107,200	104,900	400	1,600	300
Life scientists	314,100	302,100	3,600	4,100	4,200	286,300	275,600	3,000	3,900	3,800	27,800	26,500	600	300	400
Psychologists	122,900	116,900	1,600	3,300	1,100	105,700	100,100	1,500	3,200	1,100	17,200	16,800	200	100	100
Social scientists	237,200	219,400	11,600	3,400	2,800	211,400	195,700	9,800	3,300	2,600	25,600	23,700	1,800	100	100
1978															
All fields	2,741,400	2,621,200	41,800	53,700	24,700	2,507,600	2,393,000	39,600	51,300	23,200	233,800	227,600	2,200	2,500	1,500
Physical scientists	254,600	243,300	3,700	5,700	1,900	216,700	206,800	3,200	5,300	1,400	37,900	36,500	500	400	500
Mathematical scientists	107,800	101,300	3,000	2,000	1,400	89,800	83,900	2,900	1,800	1,200	18,000	17,400	100	100	200
Computer specialists	237,500	229,100	1,400	6,900	100	234,600	226,300	1,300	6,900	100	2.900	2.800	100	100	(2)
Environmental scientists	80,800	78,900	700	600	500	73,900	72,200	700	600	500	6,900	6,700	(2)	100	100
Engineers	1,396,400	1,344,000	11,400	27,000	13,900	1,285,000	1,234,400	10,600	26,400	13,600	111,300	109,600	800	700	300
Life scientists	327,600	313,100	6,700	5,900	1,900	295,800	282,400	6,600	5,200	1,600	31,800	30,700	100	700	200
Psychologists	131,700	127,000	3,700	100	800	123,200	119,000	3,500	(2)	700	8,500	8,000	300	200	(2)
Social scientists	205,100	184,600	11,000	5,400	4,000	188,500	168,700	10,700	5,100	4,000	16,600	15,900	300	300	100

[1] Includes American Indians, "Other," and "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976–78).

Appendix table 3a.—Scientists and engineers by field, sex, and labor force status: 1978

	Total		Labor force		Outside labor force	
Field	Men	Women	Men	Women	Men	Women
All fields	2,475,300	266,100	2,270,400	237,200	204,800	28,900
Physical scientists	231,800	22,800	200,700	16,000	31,100	6,800
Chemists	154,700	19,000	133,400	13,200	21,300	5,700
Physicists/Astronomers	59,300	2,200	50,900	1,400	8,500	800
Other physical scientists	17,700	1,500	16,500	1,300	1,300	200
Mathematical scientists	88,000	19,800	71,800	18,000	16,200	1,800
Mathematicians	79,400	17,800	65,100	16,600	14,200	1,200
Statisticians	8,600	2,100	6,700	1,500	1,900	600
Computer specialists	194,800	42,700	193,900	40,600	900	2,100
Environmental scientists	72,200	8,600	66,200	7,800	6,000	900
Earth scientists	62,400	8,500	57,000	7,700	5,400	900
Oceanographers	1,600	(1)	1,400	(1)	100	(1)
Atmospheric scientists	8,200	100	7,800	100	500	(1)
Engineers	1,374,600	21,700	1,264,500	20,500	110,100	1,200
Life scientists	255,400	72,200	231,500	64,300	23,900	7,900
Biological scientists	110,700	42,800	95,400	37,500	15,300	5,300
Agricultural scientists	121,700	8,700	113,400	7,000	8,300	1,700
Medical scientists	23,000	20,700	22,700	19,800	200	800
Psychologists	95,700	36,000	91,100	32,100	4,600	3,900
Social scientists	162,800	42,200	150,600	37,800	12,200	4,400
Economists	52,300	6,600	47,700	5,400	4,700	1,300
Sociologists/ Anthropologists	29,100	15,400	26,300	13,200	2,800	2,200
Other social scientists	81,400	20,200	76,700	19,300	4,700	900

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304).

Appendix table 3b.—Scientists and engineers by field, race, and labor force status: 1978

	Total					Labor force					Outside labor force				
Field	Total	White	Black	Asian	Other[1]	Total	White	Black	Asian	Other[1]	Total	White	Black	Asian	Other[1]
All fields	2,741,400	2,621,200	41,800	53,700	24,700	2,507,600	2,393,600	39,600	51,300	23,200	233,800	227,600	2,200	2,500	1,500
Physical scientists	254,600	243,300	3,700	5,700	1,900	216,700	206,800	3,200	5,300	1,400	37,900	36,500	500	400	500
Chemists	173,700	164,900	3,500	3,800	1,500	146,600	139,000	3,100	3,400	1,100	27,100	26,000	400	400	300
Physicists/ Astronomers	61,600	59,500	200	1,600	300	52,300	50,400	100	1,500	200	9,200	9,100	100	(2)	100
Other physical scientists	19,300	18,800	(2)	300	200	17,800	17,400	(2)	300	100	1,500	1,400	(2)	(2)	(2)
Mathematical scientists	107,800	101,300	3,000	2,000	1,400	89,800	83,900	2,900	1,800	1,200	18,000	17,400	100	100	200
Mathematicians	97,100	91,200	2,800	1,800	1,300	81,700	76,200	2,700	1,700	1,100	15,400	15,000	100	100	200
Statisticians	10,700	10,100	200	200	100	8,100	7,700	200	200	100	2,500	2,500	(2)	(2)	(2)
Computer specialists	237,500	229,100	1,400	6,900	100	234,600	226,300	1,300	6,900	100	2,900	2,800	100	100	(2)
Environmental scientists	80,800	78,900	700	600	500	73,900	72,200	700	600	500	6,900	6,700	(2)	100	100
Earth scientists	70,900	69,100	700	500	500	64,600	63,000	700	400	500	6,300	6,100	(2)	100	100
Oceanographers	1,600	1,400	(2)	100	(2)	1,400	1,300	(2)	100	(2)	100	100	(2)	(2)	(2)
Atmospheric scientists	8,300	8,300	(2)	(2)	(2)	7,900	7,900	(2)	(2)	(2)	500	500	(2)	(2)	(2)
Engineers	1,396,400	1,344,000	11,400	27,000	13,900	1,285,000	1,234,400	10,600	26,400	13,600	111,300	109,600	800	700	300
Life scientists	327,600	313,100	6,700	5,900	1,900	295,800	282,400	6,600	5,200	1,600	31,800	30,700	100	700	200
Biological scientists	153,500	145,000	2,800	4,500	1,100	132,900	125,100	2,700	3,900	1,000	20,700	19,900	100	600	100
Agricultural scientists	130,400	125,200	3,600	1,000	600	120,400	115,400	3,600	1,000	500	10,000	9,800	(2)	(2)	200
Medical scientists	43,600	42,900	200	400	200	42,500	41,900	200	300	100	1,100	1,000	(2)	100	(2)
Psychologists	131,700	127,000	3,700	100	800	123,200	119,000	3,500	(2)	700	8,500	8,000	300	200	(2)
Social scientists	205,100	184,600	11,000	5,400	4,000	188,500	168,700	10,700	5,100	4,000	16,600	15,900	300	300	100
Economists	59,000	57,500	100	800	500	53,000	51,900	(2)	600	500	5,900	5,600	100	200	(2)
Sociologists/ Anthropologists	44,500	36,400	5,400	400	2,300	39,500	31,500	5,400	400	2,200	5,100	5,000	(2)	(2)	100
Other social scientists	101,600	90,700	5,500	4,200	1,200	96,000	85,300	5,300	4,200	1,200	5,600	5,400	200	(2)	(2)

[1] Includes American Indians, "Other," and "No report."

[2] Too few cases to estimate.

Source: National Science Foundation, U.S. Scientists and Engineers (NSF 80-304).

Appendix table 4.—Scientists and engineers by field, sex, and employment status: 1974, 1976, and 1978

	Total employed											
	Total			In S/E			Outside S/E			Unemployed, seeking		
Field and sex	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978
All fields	2,248,200	2,377,100	2,473,200	NA	2,090,300	2,091,900	NA	286,800	381,300	39,800	74,600	34,400
Men	2,072,100	2,179,900	2,241,700	NA	1,914,500	1,957,400	NA	265,600	284,300	32,600	60,100	28,700
Women	176,100	197,200	231,500	NA	175,900	134,600	NA	21,300	97,000	7,200	14,500	5,700
Physical scientists	201,400	227,400	212,400	NA	189,400	184,700	NA	38,000	27,600	5,100	9,900	4,300
Men	185,500	207,500	197,400	NA	176,400	174,400	NA	31,100	22,900	4,400	8,400	3,400
Women	15,900	19,900	15,000	NA	13,100	10,300	NA	6,900	4,700	700	1,500	1,000
Mathematical scientists	82,800	88,300	88,400	NA	85,700	42,900	NA	2,600	45,600	1,700	3,900	1,400
Men	69,300	72,700	70,900	NA	70,300	38,100	NA	2,300	32,700	1,300	3,300	900
Women	13,500	15,600	17,500	NA	15,300	4,800	NA	300	12,800	400	600	500
Computer specialists	166,200	172,300	233,900	NA	167,200	231,400	NA	5,200	2,500	900	1,200	600
Men	134,900	138,700	193,400	NA	134,400	191,100	NA	4,300	2,200	500	800	600
Women	31,300	33,600	40,600	NA	32,700	40,300	NA	900	300	400	400	100
Environmental scientists	69,100	74,800	72,200	NA	52,000	62,400	NA	22,900	9,900	2,400	2,600	1,700
Men	64,800	71,100	64,600	NA	49,900	57,500	NA	21,200	7,100	2,300	1,800	1,600
Women	4,300	3,700	7,700	NA	2,100	5,000	NA	1,600	2,700	100	700	100
Engineers	1,212,600	1,240,700	1,268,400	NA	1,123,400	1,201,200	NA	117,300	67,200	16,000	27,200	16,700
Men	1,208,300	1,234,000	1,248,500	NA	1,117,600	1,183,400	NA	116,500	65,100	15,900	26,900	16,000
Women	4,300	6,700	19,800	NA	5,800	17,800	NA	900	2,100	100	300	700
Life scientists	238,600	277,500	291,000	NA	224,900	201,800	NA	52,600	89,100	4,800	8,800	4,900
Men	193,400	226,000	227,800	NA	176,400	165,600	NA	49,600	62,100	4,000	6,600	3,800
Women	45,200	51,400	63,200	NA	48,500	36,200	NA	2,900	26,900	800	2,200	1,200
Psychologists	89,600	97,800	120,900	NA	84,200	71,200	NA	13,500	49,700	4,400	8,000	2,300
Men	71,500	76,700	89,700	NA	64,600	58,200	NA	12,100	31,500	1,500	3,300	1,400
Women	18,100	21,100	31,200	NA	19,700	13,100	NA	1,400	18,200	2,900	4,700	900
Social scientists	187,900	198,300	186,000	NA	163,600	96,200	NA	34,700	89,800	4,500	13,100	2,500
Men	144,500	153,200	149,500	NA	124,900	89,000	NA	28,300	60,500	2,700	9,000	1,100
Women	43,400	45,200	36,400	NA	38,700	7,200	NA	6,400	29,300	1,800	4,200	1,400

NA: Not available.
Note: Detail may not add to totals because of rounding.
Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976-78).

Appendix table 5.—Scientists and engineers by field, race, and employment status: 1974, 1976, and 1978

Field	Total employed					Unemployed, seeking				
	Total	White	Black	Asian	Other [1]	Total	White	Black	Asian	Other [1]
1974										
All fields	2,248,200	2,152,900	32,500	40,500	22,500	39,800	35,600	3,000	700	300
Physical scientists	201,400	190,100	4,000	5,900	1,400	5,100	4,900	100	100	(2)
Mathematical scientists	82,800	79,300	1,800	1,300	400	1,700	1,300	400	(2)	(2)
Computer specialists	166,200	159,300	2,800	3,400	700	900	700	200	(2)	(2)
Environmental scientists	69,100	67,700	200	700	600	2,400	2,300	(2)	(2)	(2)
Engineers	1,212,600	1,169,800	10,400	21,800	10,800	16,000	15,100	500	200	(2)
Life scientists	238,600	229,100	2,600	3,300	3,400	4,800	4,600	100	100	(2)
Psychologists	89,600	84,600	1,500	2,500	1,000	4,400	4,200	200	(2)	(2)
Social scientists	187,900	172,900	9,100	1,800	4,400	4,500	2,500	1,600	100	(2)
1976										
All fields	2,377,100	2,278,800	33,000	41,400	23,800	74,600	69,400	3,000	1,200	1,000
Physical scientists	227,400	215,300	3,300	5,400	3,500	9,900	9,500	100	200	100
Mathematical scientists	88,300	84,900	2,000	1,100	200	3,900	3,100	400	100	300
Computer specialists	172,400	164,400	3,500	3,600	800	1,100	1,000	200	(2)	(2)
Environmental scientists	74,800	73,700	100	500	500	2,600	2,600	(2)	(2)	(2)
Engineers	1,240,800	1,196,800	11,700	20,600	11,800	27,200	25,600	500	800	300
Life scientists	277,500	267,000	2,900	3,900	3,700	8,800	8,600	100	(2)	100
Psychologists	97,700	92,400	1,300	3,100	1,000	8,800	7,700	200	100	(2)
Social scientists	198,300	184,300	8,200	3,300	2,500	13,100	11,400	1,600	(2)	100
1978										
All fields	2,473,200	2,360,900	39,000	50,500	22,800	34,400	32,700	600	800	400
Physical scientists	212,400	202,500	3,100	5,300	1,300	4,300	4,200	100	(2)	100
Mathematical scientists	88,400	82,600	2,900	1,800	1,200	1,400	1,300	(2)	(2)	(2)
Computer specialists	233,900	225,800	1,100	6,900	100	600	500	200	(2)	(2)
Environmental scientists	72,200	70,600	700	600	400	1,700	1,600	(2)	(2)	100
Engineers	1,268,400	1,217,900	10,600	26,400	13,500	16,600	16,500	(2)	(2)	100
Life scientists	291,000	278,200	6,600	4,600	1,400	4,900	4,200	(2)	600	200
Psychologists	120,900	117,000	3,300	(2)	700	2,300	2,000	1,200	(2)	(2)
Social scientists	186,000	166,300	10,600	5,100	4,000	2,500	2,400	100	(2)	(2)

[1] Includes American Indians, "Other," and "No Report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976-1978).

Appendix table 6a.—Scientists and engineers by field, sex, and employment status: 1978

	Total employed							
	Total		In S/E		Outside S/E		Unemployed, seeking	
Field	Men	Women	Men	Women	Men	Women	Men	Women
All fields	2,241,700	231,500	1,957,400	134,600	284,300	97,000	28,700	5,700
Physical scientists	197,400	15,000	174,400	10,300	22,900	4,700	3,400	1,000
Chemists	131,400	12,300	117,100	8,700	14,300	3,700	2,000	900
Physicists/Astronomers	49,800	1,400	43,100	900	6,700	500	1,100	(1)
Other physical scientists	16,200	1,300	14,300	700	1,900	600	300	(1)
Mathematical scientists	70,900	17,500	38,100	4,800	32,700	12,800	900	500
Mathematicians	64,300	16,200	34,400	3,900	29,900	12,200	800	400
Statisticians	6,700	1,300	3,800	900	2,800	600	100	(1)
Computer specialists	193,400	40,600	191,100	40,300	2,200	300	600	100
Environmental scientists	64,600	7,700	57,500	5,000	7,100	2,700	1,600	100
Earth scientists	55,400	7,600	48,300	4,900	7,100	2,700	1,600	100
Oceanographers	1,400	(1)	1,400	(1)	(1)	(1)	(1)	(1)
Atmospheric scientists	7,700	100	7,700	100	(1)	(1)	(1)	(1)
Engineers	1,248,500	19,800	1,183,400	17,800	65,100	2,100	16,000	700
Life scientists	227,800	63,200	165,600	36,200	62,100	26,900	3,800	1,200
Biological scientists	93,600	37,000	60,800	13,300	32,700	23,700	1,900	500
Agricultural scientists	111,500	6,400	82,200	3,200	29,300	3,200	1,900	600
Medical scientists	22,700	19,700	22,600	19,700	100	(1)	(1)	100
Psychologists	89,700	31,200	58,200	13,100	31,500	18,200	1,400	900
Social scientists	149,500	36,400	89,000	7,200	60,500	29,300	1,100	1,400
Economists	47,100	5,400	32,200	2,200	15,000	3,200	500	(1)
Sociologists/ Anthropologists	25,900	12,000	8,200	1,200	17,700	10,700	400	1,200
Other social scientists	76,500	19,100	48,700	3,800	27,800	15,400	200	100

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (NSF 80-304) and unpublished data.

Appendix table 6b.—Scientists and engineers by field, race, and employment status: 1978

Field	Total employed					Unemployed, seeking				
	Total	White	Black	Asian	Other [1]	Total	White	Black	Asian	Other [1]
All fields	2,473,200	2,360,900	39,000	50,500	22,800	34,400	32,700	600	800	400
Physical scientists	212,400	202,500	3,100	5,300	1,300	4,300	4,200	100	(2)	100
Chemists	143,800	136,200	3,000	3,400	1,100	2,900	2,800	100	(2)	(2)
Physicists/Astronomers	51,200	49,300	100	1,500	200	1,100	1,100	(2)	(2)	(2)
Other physical scientists	17,500	17,100	(2)	300	(2)	300	300	(2)	(2)	100
Mathematical scientists	88,400	82,600	2,900	1,800	1,200	1,400	1,300	(2)	(2)	(2)
Mathematicians	80,400	75,000	2,700	1,700	1,100	1,300	1,200	(2)	(2)	(2)
Statisticians	8,000	7,600	200	200	100	100	100	(2)	(2)	(2)
Computer specialists	233,900	225,800	1,100	6,900	100	600	500	200	(2)	(2)
Environmental scientists	72,200	70,600	700	600	400	1,700	1,600	(2)	(2)	100
Earth scientists	62,900	61,400	700	400	400	1,700	1,600	(2)	(2)	100
Oceanographers	1,400	1,300	(2)	100	(2)	(2)	(2)	(2)	(2)	(2)
Atmospheric scientists	7,900	7,900	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Engineers	1,268,400	1,217,900	10,600	26,400	13,500	16,600	16,500	(2)	(2)	100
Life scientists	291,000	278,200	6,600	4,600	1,400	4,900	4,200	(2)	600	200
Biological scientists	130,600	123,600	2,700	3,300	800	2,300	1,500	(2)	600	200
Agricultural scientists	117,900	112,900	3,600	1,000	500	2,500	2,500	(2)	(2)	(2)
Medical scientists	42,400	41,800	200	300	100	100	100	(2)	(2)	(2)
Psychologists	120,900	117,000	3,300	(2)	700	2,300	2,000	200	(2)	(2)
Social scientists	186,000	166,300	10,600	5,100	4,000	2,500	2,400	100	(2)	(2)
Economists	52,500	51,400	(2)	600	500	500	500	(2)	(2)	(2)
Sociologists/ Anthropologists	37,900	30,000	5,300	400	2,200	1,600	1,500	100	(2)	(2)
Other social scientists	95,600	85,000	5,300	4,200	1,200	400	300	(2)	(2)	(2)

[1] Includes American Indians, "Other," and "No Report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundationn, U.S. Scientists and Engineers (NSF 80-304).

Appendix table 7.—Doctoral scientists and engineers by field, sex, and labor force status: 1973, 1977, and 1979

	Total[1]			Labor force			Total employed			Outside labor force		
Field and sex	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	238,900	303,300	332,300	222,900	287,600	316,700	220,400	284,300	313,700	10,700	13,100	14,800
Men	218,000	271,600	294,400	205,300	259,100	282,400	203,500	256,800	280,400	8,300	10,200	11,300
Women	20,900	31,700	37,900	17,600	28,500	34,300	17,000	27,500	33,300	2,400	2,900	3,500
Physical scientists	53,000	62,000	64,300	49,300	58,200	60,900	48,500	57,500	60,200	2,700	3,300	3,300
Men	50,500	58,500	60,600	47,300	55,200	57,600	46,600	54,600	57,000	2,300	2,900	2,900
Women	2,500	3,500	3,700	2,000	3,100	3,200	1,900	2,900	3,100	400	400	400
Mathematical scientists	13,100	15,400	16,100	12,300	14,800	15,400	12,100	14,600	15,300	500	500	700
Men	12,100	14,200	14,800	11,500	13,700	14,200	11,400	13,500	14,200	400	400	500
Women	1,000	1,200	1,300	800	1,100	1,200	800	1,000	1,100	100	100	100
Computer specialists	2,700	5,800	6,800	2,700	5,800	6,800	2,700	5,800	6,700	(2)	(2)	(2)
Men	2,600	5,600	6,400	2,600	5,500	6,400	2,600	5,500	6,400	(2)	(2)	(2)
Women	100	200	400	100	200	400	100	200	400	(2)	(2)	(2)
Environmental scientists	10,900	13,500	15,100	10,400	13,100	14,700	10,300	13,000	14,600	300	400	400
Men	10,600	13,100	14,400	10,200	12,700	14,000	10,100	12,600	14,000	300	300	300
Women	300	500	700	300	500	600	300	400	600	(2)	(2)	(2)
Engineers	37,300	46,500	51,600	36,000	45,300	50,500	35,800	45,000	50,200	700	900	1,000
Men	37,100	46,200	51,000	35,900	45,000	49,900	35,600	44,800	49,700	700	900	900
Women	200	300	600	100	300	500	100	300	500	(2)	(2)	(2)
Life scientists	63,600	78,300	86,300	58,600	72,900	81,000	58,000	71,900	80,100	3,500	4,700	5,200
Men	55,800	67,600	73,200	52,200	63,600	69,500	51,900	63,000	68,900	2,500	3,400	3,700
Women	7,800	10,800	13,100	6,400	9,300	11,500	6,100	9,000	11,100	1,000	1,400	1,500
Psychologists	27,200	35,700	40,300	25,100	34,200	38,400	24,900	33,700	38,000	1,200	1,200	1,700
Men	21,500	27,200	30,100	20,200	26,300	29,000	20,100	26,100	28,800	700	600	1,000
Women	5,600	8,500	10,200	4,900	7,800	9,400	4,800	7,600	9,200	500	600	700
Social scientists	31,200	45,800	52,000	28,400	43,300	49,200	28,100	42,700	48,600	1,700	2,100	2,600
Men	27,700	39,200	43,800	25,400	37,100	41,700	25,200	36,800	41,400	1,400	1,700	2,000
Women	3,500	6,600	8,100	3,000	6,200	7,500	2,900	6,000	7,200	300	400	600

[1] "Labor force" plus "Outside labor force" will not add to total population because "No report" is not included.

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 8.—Doctoral scientists and engineers by field, race, and labor force status: 1973, 1977, and 1979

Field and race	Total			Labor force			Total employed			Outside labor force[1]		
	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	238,900	303,300	332,300	222,900	287,600	316,700	220,400	284,300	313,700	10,700	13,100	14,800
White	217,100	270,600	293,500	203,100	256,400	279,300	200,900	253,600	276,900	9,500	11,900	13,500
Black	2,200	2,900	3,700	2,100	2,800	3,500	2,100	2,800	3,400	100	(2)	200
Asian	9,600	15,800	21,700	9,300	15,600	21,300	9,100	15,300	21,000	100	200	400
Other[3]	9,900	14,100	13,400	8,400	12,900	12,600	8,300	12,600	12,400	1,000	1,000	800
Physical scientists	53,000	62,000	64,300	49,300	58,200	60,900	48,500	57,500	60,200	2,700	3,300	3,300
White	47,900	55,300	56,900	44,700	51,900	53,600	44,000	51,300	53,100	2,400	3,000	3,100
Black	500	600	600	500	600	500	500	600	500	(2)	(2)	(2)
Asian	2,200	3,400	4,500	2,200	3,300	4,400	2,100	3,200	4,300	(2)	100	100
Other	2,300	2,700	2,400	1,900	2,400	2,300	1,900	2,400	2,200	200	300	100
Mathematical scientists	13,100	15,400	16,100	12,300	14,800	15,400	12,100	14,600	15,300	500	500	700
White	11,800	13,600	13,900	11,200	13,100	13,300	11,000	12,900	13,200	500	500	600
Black	100	100	200	100	100	200	100	100	200	(2)	(2)	(2)
Asian	500	700	1,000	500	700	900	500	700	900	(2)	(2)	(2)
Other	600	900	1,000	500	800	1,000	500	800	900	(2)	100	(2)
Computer specialists	2,700	5,800	6,800	2,700	5,800	6,700	2,700	5,800	6,700	(2)	(2)	(2)
White	2,500	5,000	6,000	2,500	5,000	6,000	2,500	5,000	6,000	(2)	(2)	(2)
Black	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	100	600	500	100	600	500	100	600	500	(2)	(2)	(2)
Other	100	200	300	100	200	300	100	200	300	(2)	(2)	(2)
Environmental scientists	10,900	13,500	15,100	10,400	13,000	14,700	10,300	13,000	14,600	300	400	400
White	10,200	12,500	14,000	9,700	12,100	13,600	9,700	12,100	13,600	300	400	400
Black	(2)	(2)	100	(2)	(2)	100	(2)	(2)	100	(2)	(2)	(2)
Asian	300	500	500	300	500	500	300	500	500	(2)	(2)	(2)
Other	400	500	500	400	400	500	400	400	500	(2)	(2)	(2)
Engineers	37,300	46,500	51,500	36,000	45,300	50,500	35,800	45,000	50,200	700	900	1,000
White	33,100	39,700	42,100	32,000	38,600	41,200	31,800	38,300	41,000	600	800	800
Black	100	100	200	100	100	200	100	100	200	(2)	(2)	(2)
Asian	2,800	4,900	7,700	2,700	4,900	7,600	2,700	4,800	7,500	(2)	(2)	100
Other	1,200	1,800	1,600	1,000	1,700	1,500	1,100	1,700	1,500	100	100	100
Life scientists	63,600	78,300	86,300	58,600	72,900	81,000	58,000	71,900	80,100	3,500	4,700	5,200
White	58,000	70,200	77,000	53,600	65,300	72,200	53,100	64,500	71,500	3,100	4,300	4,600
Black	700	800	1,000	700	800	900	700	800	900	(2)	(2)	100
Asian	2,500	3,900	5,100	2,400	3,800	4,900	2,300	3,800	4,900	100	100	100
Other	2,500	3,400	3,200	2,000	3,000	2,900	2,000	2,900	2,800	300	400	300
Psychologists	27,200	35,700	40,300	25,100	34,200	38,400	24,900	33,700	38,000	1,200	1,200	1,700
White	25,200	32,900	37,200	23,500	31,500	35,500	23,200	31,100	35,100	1,100	1,100	1,500
Black	300	500	600	300	500	600	300	500	600	(2)	(2)	(2)
Asian	200	300	400	200	300	400	200	300	400	(2)	(2)	(2)
Other	1,400	2,100	2,000	1,200	1,900	1,900	1,100	1,900	1,900	100	100	100
Social scientists	31,200	45,800	52,000	28,400	43,300	49,200	28,100	42,700	48,600	1,700	2,100	2,600
White	28,400	41,300	46,400	25,900	39,000	43,800	25,700	38,500	43,400	1,500	1,900	2,400
Black	400	700	1,100	400	600	1,000	400	600	1,000	(2)	(2)	(2)
Asian	1,000	1,400	2,100	900	1,400	2,100	900	1,400	2,000	(2)	(2)	(2)
Other	1,400	2,500	2,400	1,200	2,300	2,200	1,100	2,300	2,200	200	100	100

[1] Detail will not add to total population because "No report" is not included.

[2] Too few cases to estimate.

[3] Includes American Indians and "No report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 9a.—Doctoral scientists and engineers by field, sex, and labor force status: 1979

	Total		Labor force		Total employed		Outside labor force	
Field	Men	Women	Men	Women	Men	Women	Men	Women
All fields	294,400	37,900	282,400	34,300	280,400	33,300	11,300	3,500
Physical scientists	60,600	3,700	57,600	3,200	57,000	3,100	2,900	400
Chemists	39,600	3,000	37,400	2,600	37,000	2,500	2,100	400
Physicists/Astronomers	21,000	700	20,200	600	20,000	600	700	100
Mathematical scientists	14,800	1,300	14,200	1,200	14,200	1,100	500	100
Mathematicians	12,500	1,100	12,000	1,000	12,000	1,000	500	100
Statisticians	2,300	200	2,200	200	2,200	200	(1)	(1)
Computer specialists	6,400	400	6,400	400	6,400	400	(1)	(1)
Environmental scientists	14,400	700	14,000	600	14,000	600	300	(1)
Earth scientists	11,100	500	10,800	400	10,700	400	300	(1)
Oceanographers	1,500	200	1,500	200	1,500	200	(1)	(1)
Atmospheric scientists	1,800	(1)	1,800	(1)	1,800	(1)	(1)	(1)
Engineers	51,000	600	49,900	500	49,700	500	900	(1)
Life scientists	73,200	13,100	69,500	11,500	68,900	11,100	3,700	1,500
Biological scientists	40,500	9,500	38,200	8,200	37,900	7,900	2,200	1,200
Agricultural scientists	15,700	400	14,800	400	14,700	300	900	(1)
Medical scientists	17,000	3,200	16,400	3,000	16,300	2,900	600	200
Psychologists	30,100	10,200	29,000	9,400	28,800	9,200	1,000	700
Social scientists	43,800	8,100	41,700	7,500	41,400	7,200	2,000	600
Economists	11,400	1,100	10,800	1,000	10,700	1,000	600	100
Sociologists/ Anthropologists	8,200	2,800	7,800	2,700	7,700	2,700	400	200
Other social scientists	24,200	4,100	23,100	3,800	23,000	3,700	1,000	300

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 9b.—Doctoral scientists and engineers by field, race, and labor force status: 1979

Field and race	Total	Labor force	Total employed	Outside labor force
All fields	332,300	316,700	313,700	14,800
White	293,500	279,300	276,900	13,500
Black	3,700	3,500	3,400	200
Asian	21,700	21,300	21,000	400
Other[1]	13,400	12,600	12,400	800
Physical scientists	64,300	60,900	60,200	3,300
White	56,900	53,600	53,100	3,100
Black	600	500	500	(2)
Asian	4,500	4,400	4,300	100
Other	2,400	2,300	2,200	100
Chemists	42,700	40,000	39,600	2,500
White	37,600	35,100	34,800	2,400
Black	400	400	400	(2)
Asian	3,200	3,100	3,100	100
Other	1,400	1,400	1,300	100
Physicists/Astronomers	21,700	20,800	20,600	800
White	19,200	18,500	18,300	700
Black	200	200	100	(2)
Asian	1,300	1,300	1,300	(2)
Other	1,000	1,000	1,000	100
Mathematical scientists	16,100	15,400	15,300	700
White	13,900	13,300	13,200	600
Black	200	200	200	(2)
Asian	1,000	900	900	(2)
Other	1,000	900	900	(2)
Mathematicians	13,600	13,000	12,900	600
White	11,900	11,300	11,200	600
Black	100	100	100	(2)
Asian	700	700	700	(2)
Other	900	900	900	(2)
Statisticians	2,400	2,400	2,400	100
White	2,100	2,000	2,000	100
Black	(2)	(2)	(2)	(2)
Asian	200	200	200	(2)
Other	100	100	100	(2)

Appendix table 9b.—(con.)

Field and race	Total	Labor force	Total employed	Outside labor force
Computer specialists	6,800	6,800	6,700	(2)
White	6,000	6,000	6,000	(2)
Black	(2)	(2)	(2)	(2)
Asian	500	500	500	(2)
Other	300	300	300	(2)
Environmental scientists	15,100	14,700	14,600	400
White	14,000	13,600	13,600	400
Black	100	100	100	(2)
Asian	400	500	500	(2)
Other	500	500	500	(2)
Earth scientists	11,600	11,200	11,100	400
White	10,800	10,400	10,400	400
Black	100	100	100	(2)
Asian	300	300	300	(2)
Other	400	400	400	(2)
Oceanographers	1,700	1,700	1,700	(2)
White	1,600	1,600	1,600	(2)
Black	(2)	(2)	(2)	(2)
Asian	100	100	100	(2)
Other	(2)	(2)	(2)	(2)
Atmospheric scientists	1,800	1,800	1,800	(2)
White	1,600	1,600	1,600	(2)
Black	(2)	(2)	(2)	(2)
Asian	100	100	100	(2)
Other	100	100	100	(2)
Engineers	51,500	50,500	50,200	1,000
White	42,100	41,200	41,000	800
Black	200	200	200	(2)
Asian	7,700	7,600	7,500	100
Other	1,600	1,500	1,500	100
Life scientists	86,300	81,000	80,100	5,200
White	77,000	72,200	71,500	4,600
Black	1,000	900	900	100
Asian	5,100	4,900	4,900	100
Other	3,200	2,900	2,800	300

Appendix table 9b.—(con.)

Field and race	Total	Labor force	Total employed	Outside labor force
Biological scientists	50,000	46,400	45,700	3,500
White	44,400	41,200	40,600	3,200
Black	600	600	600	(2)
Asian	3,100	3,000	3,000	100
Other	1,900	1,700	1,600	200
Agricultural scientists	16,100	15,200	15,100	900
White	14,700	13,900	13,800	800
Black	200	100	100	(2)
Asian	700	700	700	(2)
Other	500	400	400	100
Medical scientists	20,200	19,400	19,300	800
White	17,800	17,100	17,100	700
Black	300	200	200	(2)
Asian	1,300	1,200	1,200	100
Other	800	800	800	(2)
Psychologists	40,300	38,400	38,000	1,700
White	37,200	35,500	35,100	1,500
Black	600	600	600	(2)
Asian	400	400	400	(2)
Other	2,000	1,900	1,900	100
Social scientists	52,000	49,200	48,600	2,600
White	46,400	43,800	43,400	2,400
Black	1,100	1,000	1,000	(2)
Asian	2,100	2,100	2,000	(2)
Other	2,400	2,200	2,200	100
Economists	12,500	11,800	11,700	700
White	11,100	10,500	10,400	600
Black	200	200	200	(2)
Asian	700	700	700	(2)
Other	500	400	400	(2)
Sociologists/Anthropologists	11,100	10,400	10,200	600
White	9,900	9,400	9,200	500
Black	200	200	200	(2)
Asian	400	300	300	(2)
Other	500	500	400	(2)

Appendix table 9b.—(con.)

Field and race	Total	Labor force	Total employed	Outside labor force
Other social scientists	28,400	27,000	26,700	1,300
White	25,300	24,000	23,800	1,200
Black	600	600	500	(2)
Asian	1,100	1,100	1,100	(2)
Other	1,400	1,400	1,300	(2)

[1] Includes American Indians and "No report".

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 10.—Doctoral scientists and engineers by field, sex, and employment status: 1973, 1977, and 1979

Field and sex	Total employed											
	Employed in S/E			Employed in non-S/E			Postdoctorates			Unemployed, seeking		
	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	200,600	251,600	277,200	14,100	22,900	26,400	5,700	9,800	10,200	2,500	3,300	2,900
Men	185,900	228,700	249,400	12,700	20,400	23,000	4,800	7,700	8,000	1,800	2,300	2,000
Women	14,700	22,900	27,700	1,400	2,600	3,400	900	2,000	2,200	700	1,000	900
Physical scientists	42,400	48,800	52,200	4,200	6,000	5,800	1,900	2,600	2,200	900	800	700
Men	40,900	46,600	49,700	4,000	5,700	5,400	1,700	2,300	1,900	700	600	600
Women	1,500	2,200	2,500	300	400	400	100	300	300	100	200	100
Mathematical scientists	11,600	13,500	13,900	400	1,000	1,200	100	100	200	200	200	100
Men	10,900	12,500	12,900	400	900	1,100	100	100	200	100	200	(1)
Women	700	1,000	1,000	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Computer specialists	2,700	5,600	6,600	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Men	2,600	5,400	6,200	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Women	100	200	400	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	9,900	12,200	13,800	300	500	500	200	400	300	100	100	(1)
Men	9,600	11,800	13,200	300	400	500	200	300	300	100	100	(1)
Women	200	400	600	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Engineers	33,900	42,100	46,900	1,600	2,600	3,100	200	400	300	300	300	300
Men	33,800	41,800	46,400	1,600	2,600	3,000	200	400	200	300	300	300
Women	100	300	500	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Life scientists	52,800	62,900	69,900	2,400	3,800	4,000	2,800	5,200	6,200	600	1,000	900
Men	47,700	55,800	60,900	2,000	3,200	3,300	2,200	3,900	4,700	300	700	500
Women	5,100	7,100	9,000	400	500	700	600	1,300	1,500	300	300	400
Psychologists	23,100	30,800	34,500	1,500	2,400	2,900	300	600	600	300	400	400
Men	18,700	24,000	26,300	1,200	1,800	2,100	200	400	400	100	200	300
Women	4,400	6,900	8,200	300	600	800	100	200	200	100	200	200
Social scientists	24,200	35,600	39,400	3,700	6,700	8,800	200	500	500	300	600	500
Men	21,700	30,700	33,700	3,300	5,700	7,300	200	400	300	200	400	300
Women	2,400	4,900	5,600	400	1,000	1,500	(1)	100	100	100	200	200

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 11.—Doctoral scientists and engineers by field, race, and employment status: 1973, 1977, and 1979

Field and race	Total employed: Employed in S/E 1973	1977	1979	Employed in non-S/E 1973	1977	1979	Postdoctorates 1973	1977	1979	Unemployed, seeking 1973	1977	1979
All fields	200,600	251,600	277,200	14,100	22,900	26,400	5,700	9,800	10,200	2,500	3,300	2,900
White	183,000	225,000	244,800	12,900	20,500	23,500	5,000	8,100	8,600	2,200	2,900	2,400
Black	1,800	2,300	2,900	300	400	400	(1)	100	100	(1)	(1)	100
Asian	8,200	13,200	18,600	400	900	1,200	500	1,300	1,200	200	200	200
Other[2]	7,600	11,500	10,800	600	1,200	1,200	100	300	400	100	200	200
Physical scientists	42,400	48,800	52,200	4,200	6,000	5,800	1,900	2,600	2,200	900	800	700
White	38,500	43,800	46,300	3,900	5,400	5,200	1,600	2,000	1,700	700	600	500
Black	500	500	500	100	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	1,800	2,600	3,600	100	200	300	200	400	400	100	100	100
Other	1,600	2,000	1,800	200	300	300	(1)	100	100	100	100	100
Mathematical scientists	11,600	13,500	13,900	400	1,000	1,200	100	100	200	200	200	100
White	10,500	12,000	12,100	400	900	1,000	100	100	100	200	100	100
Black	100	100	200	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	700	800	(1)	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)
Other	500	700	800	(1)	100	100	(1)	(1)	100	(1)	(1)	(1)
Computer specialists	2,700	5,600	6,600	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
White	2,400	4,800	5,800	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	100	600	400	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	100	200	300	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	9,900	12,200	13,800	300	500	500	200	400	300	100	100	(1)
White	9,200	11,300	12,800	300	400	500	200	300	300	100	100	(1)
Black	(1)	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	200	500	400	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	400	400	500	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Engineers	33,900	42,100	46,900	1,600	2,600	3,100	200	400	300	300	300	300
White	30,100	35,800	38,200	1,400	2,300	2,600	200	200	200	200	200	200
Black	100	100	200	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	2,600	4,500	7,000	100	200	400	(1)	100	100	(1)	(1)	100
Other	1,000	1,600	1,400	100	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Life scientists	52,800	62,900	69,900	2,400	3,800	4,000	2,800	5,200	6,200	600	1,000	900
White	48,400	56,700	62,500	2,200	3,400	3,600	2,500	4,400	5,400	500	900	800
Black	600	700	800	100	(1)	100	(1)	100	(1)	(1)	(1)	(1)
Asian	2,000	3,000	4,200	100	200	100	300	700	500	100	100	100
Other	1,900	2,600	2,400	100	200	200	(1)	100	200	(1)	(1)	(1)
Psychologists	23,100	30,800	34,500	1,500	2,400	2,900	300	600	600	300	400	400
White	21,700	28,400	32,000	1,400	2,100	2,600	200	500	600	200	400	400
Black	200	400	500	(1)	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Asian	200	300	300	(1)	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)
Other	1,100	1,700	1,700	100	200	200	(1)	(1)	(1)	(1)	(1)	(1)
Social scientists	24,200	35,600	39,400	3,700	6,700	8,800	200	500	500	300	600	500
White	22,100	32,100	35,000	3,400	5,900	8,100	200	400	300	200	500	400
Black	300	500	800	100	100	200	(1)	(1)	(1)	(1)	(1)	(1)
Asian	800	1,100	1,600	100	300	300	(1)	(1)	100	(1)	(1)	(1)
Other	1,000	1,800	1,900	100	400	300	(1)	(1)	(1)	(1)	(1)	100

[1] Too few cases to estimate.

[2] Includes American Indians and "No report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 12a.—Doctoral scientists and engineers by field, sex, and employment status: 1979

	Employed in S/E		Employed in non-S/E		Postdoctorates		Unemployed, seeking	
Field	Men	Women	Men	Women	Men	Women	Men	Women
All fields	249,400	27,700	23,000	3,400	8,000	2,200	2,000	900
Physical scientists	49,700	2,500	5,400	400	1,900	300	600	100
Chemists	32,600	2,000	3,300	300	1,100	200	400	100
Physicists/Astronomers	17,100	400	2,100	100	800	100	200	(1)
Mathematical scientists	12,900	1,000	1,100	100	200	(1)	(1)	(1)
Mathematicians	10,700	900	1,100	100	200	(1)	(1)	(1)
Statisticians	2,200	200	(1)	(1)	(1)	(1)	(1)	(1)
Computer specialists	6,200	400	100	(1)	(1)	(1)	(1)	(1)
Environmental scientists	13,200	600	500	(1)	300	(1)	(1)	(1)
Earth scientists	10,200	400	500	(1)	100	(1)	(1)	(1)
Oceanographers	1,400	100	(1)	(1)	(1)	(1)	(1)	(1)
Atmospheric scientists	1,600	(1)	(1)	(1)	100	(1)	(1)	(1)
Engineers	46,400	500	3,000	(1)	200	(1)	300	(1)
Life scientists	60,900	9,000	3,300	700	4,700	1,500	500	400
Biological scientists	32,400	6,100	2,400	500	3,100	1,200	400	300
Agricultural scientists	13,900	300	700	(1)	200	(1)	100	(1)
Medical scientists	14,600	2,600	300	100	1,400	300	100	(1)
Psychologists	26,300	8,200	2,100	800	400	200	300	200
Social scientists	33,700	5,600	7,300	1,500	300	100	300	200
Economists	8,400	800	2,200	100	200	(1)	(1)	(1)
Sociologists/ Anthropologists	6,400	2,100	1,100	400	100	100	100	100
Other social scientists	18,900	2,700	4,100	900	(1)	(1)	200	100

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 12b.—Doctoral scientists and engineers by field, race, and employment status: 1979

Field and race	Employed in S/E	Employed in non-S/E	Post-doctorates	Unemployed, seeking
All fields	277,200	26,400	10,200	2,900
White	244,800	23,500	8,600	2,400
Black	2,900	400	100	100
Asian	18,600	1,200	1,200	200
Other[1]	10,800	1,200	400	200
Physical scientists	52,200	5,800	2,200	700
White	46,300	5,200	1,700	500
Black	500	(2)	(2)	(2)
Asian	3,600	300	400	100
Other	1,800	300	100	100
Chemists	34,600	3,600	1,400	500
White	30,600	3,200	1,000	300
Black	300	(2)	(2)	(2)
Asian	2,600	(2)	300	100
Other	1,000	200	100	(2)
Physicists/Astronomers	17,600	2,200	900	200
White	15,600	1,900	700	200
Black	100	(2)	(2)	(2)
Asian	1,000	100	100	(2)
Other	800	100	(2)	(2)
Mathematical scientists	13,900	1,200	200	100
White	12,100	1,000	100	100
Black	200	(2)	(2)	(2)
Asian	800	100	(2)	(2)
Other	800	100	100	(2)
Mathematicians	11,600	1,200	200	100
White	10,100	1,000	100	100
Black	100	(2)	(2)	(2)
Asian	600	100	(2)	(2)
Other	700	100	100	(2)
Statisticians	2,300	(2)	(2)	(2)
White	2,000	(2)	(2)	(2)
Black	(2)	(2)	(2)	(2)
Asian	200	(2)	(2)	(2)
Other	100	(2)	(2)	(2)

Appendix table 12b.—(con.)

Field and race	Employed in S/E	Employed in non-S/E	Post-doctorates	Unemployed, seeking
Computer specialists	6,600	100	(2)	(2)
White	5,800	100	(2)	(2)
Black	(2)	(2)	(2)	(2)
Asian	400	(2)	(2)	(2)
Other	300	(2)	(2)	(2)
Environmental scientists	13,800	500	300	(2)
White	12,800	500	300	(2)
Black	100	(2)	(2)	(2)
Asian	400	(2)	(2)	(2)
Other	500	(2)	(2)	(2)
Earth scientists	10,500	500	100	(2)
White	9,800	400	100	(2)
Black	100	(2)	(2)	(2)
Asian	300	(2)	(2)	(2)
Other	300	(2)	(2)	(2)
Oceanographers	1,600	(2)	(2)	(2)
White	1,500	(2)	(2)	(2)
Black	(2)	(2)	(2)	(2)
Asian	100	(2)	(2)	(2)
Other	(2)	(2)	(2)	(2)
Atmospheric scientists	1,700	(2)	100	(2)
White	1,500	(2)	100	(2)
Black	(2)	(2)	(2)	(2)
Asian	100	(2)	(2)	(2)
Other	100	(2)	(2)	(2)
Engineers	46,900	3,100	300	300
White	38,200	2,600	200	200
Black	200	(2)	(2)	(2)
Asian	7,000	400	100	100
Other	1,400	100	(2)	(2)
Life scientists	69,900	4,000	6,200	900
White	62,500	3,600	5,400	800
Black	800	100	(2)	(2)
Asian	4,200	100	500	100
Other	2,400	200	200	(2)

Appendix table 12b.—(con.)

Field and race	Employed in S/E	Employed in non-S/E	Post-doctorates	Unemployed, seeking
Biological scientists	38,600	2,900	4,300	700
White	34,200	2,600	3,800	600
Black	500	(2)	(2)	(2)
Asian	2,500	100	400	100
Other	1,400	200	100	(2)
Agricultural scientists	14,100	700	200	100
White	13,000	700	100	100
Black	100	(2)	(2)	(2)
Asian	600	(2)	100	(2)
Other	400	(2)	(2)	(2)
Medical scientists	17,200	300	1,700	100
White	15,300	300	1,500	100
Black	200	(2)	(2)	(2)
Asian	1,100	(2)	100	(2)
Other	600	(2)	100	(2)
Psychologists	34,500	2,900	600	400
White	32,000	2,600	600	400
Black	500	100	(2)	(2)
Asian	300	100	(2)	(2)
Other	1,700	200	(2)	(2)
Social scientists	39,400	8,800	500	500
White	35,000	8,100	400	400
Black	800	200	(2)	(2)
Asian	1,600	300	100	(2)
Other	1,900	300	(2)	100
Economists	9,300	2,300	200	(2)
White	8,200	2,200	100	(2)
Black	100	100	(2)	(2)
Asian	600	(2)	100	(2)
Other	400	(2)	(2)	(2)
Sociologists/Anthropologists	8,500	1,500	200	200
White	7,600	1,400	200	200
Black	200	(2)	(2)	(2)
Asian	300	(2)	(2)	(2)
Other	400	100	(2)	(2)

Appendix table 12b.—(con.)

Field and race	Employed in S/E	Employed in non-S/E	Post-doctorates	Unemployed, seeking
Other social scientists	21,600	5,000	100	300
White	19,200	4,500	100	200
Black	400	100	(2)	(2)
Asian	800	300	(2)	(2)
Other	1,100	200	(2)	(2)

[1] Includes American Indians and "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

88

Appendix table 13.—Doctoral women scientists and engineers by field, race, and labor force status: 1973, 1977, and 1979

	Total			Labor force			Total employed			Outside labor force [1]		
Field and race	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	20,870	31,670	37,910	17,620	28,480	34,270	16,960	27,500	33,340	2,420	2,930	3,490
White	18,830	28,120	33,320	15,940	25,220	30,030	15,380	24,390	29,230	2,160	2,700	3,170
Black	300	560	850	260	530	800	260	520	790	20	10	50
Asian	810	1,510	2,250	720	1,410	2,110	640	1,310	2,030	70	90	120
Other[2]	930	1,480	1,490	700	1,320	1,330	680	1,280	1,310	160	130	150
Physical scientists	2,540	3,530	3,690	2,040	3,070	3,240	1,900	2,910	3,120	410	440	430
White	2,210	2,990	2,990	1,760	2,570	2,580	1,660	2,460	2,510	380	390	380
Black	30	40	50	20	40	50	20	40	50	(3)	(3)	(3)
Asian	200	380	550	180	340	520	150	300	480	10	30	40
Other	110	130	110	70	120	90	60	110	90	30	10	20
Mathematical scientists	950	1,210	1,300	800	1,080	1,160	780	1,050	1,140	140	120	130
White	850	1,060	1,110	710	940	990	700	910	970	130	110	110
Black	20	20	10	20	20	10	20	20	10	(3)	(3)	(3)
Asian	60	70	110	50	70	100	40	60	100	10	10	10
Other	30	60	60	20	60	60	20	60	60	10	(3)	10
Computer specialists	90	240	370	90	230	370	90	230	370	(3)	(3)	10
White	80	200	290	80	190	290	80	190	290	(3)	(3)	10
Black	(3)	(3)	10	(3)	(3)	10	(3)	(3)	10	(3)	(3)	(3)
Asian	(3)	20	60	(3)	20	60	(3)	20	60	(3)	(3)	(3)
Other	(3)	20	20	(3)	20	20	(3)	20	20	(3)	(3)	(3)
Environmental scientists	300	490	660	270	460	620	260	440	610	30	40	40
White	280	450	610	250	420	570	250	400	560	30	30	40
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	10	20	40	10	20	40	10	20	40	(3)	(3)	(3)
Other	10	20	10	10	10	10	10	10	10	(3)	(3)	(3)
Engineers	170	320	560	150	290	540	140	280	530	10	20	20
White	130	260	430	110	230	420	100	230	410	10	20	10
Black	(3)	(3)	10	(3)	(3)	10	(3)	(3)	10	(3)	(3)	(3)
Asian	30	40	100	30	40	100	20	40	100	(3)	(3)	(3)
Other	10	20	20	10	10	20	10	10	20	(3)	(3)	(3)
Life scientists	7,750	10,760	13,070	6,380	9,310	11,490	6,120	8,980	11,140	1,040	1,370	1,520
White	7,000	9,460	11,360	5,780	8,160	9,940	5,560	7,880	9,650	920	1,230	1,370
Black	100	170	300	90	160	270	90	150	260	(3)	10	20
Asian	410	740	1,010	350	680	930	320	650	900	40	40	60
Other	250	400	410	160	320	350	160	310	330	70	80	70
Psychologists	5,610	8,480	10,150	4,920	7,840	9,390	4,780	7,650	9,220	460	550	730
White	5,110	7,690	9,260	4,510	7,080	8,550	4,380	6,910	8,380	420	530	680
Black	110	190	250	80	190	230	80	180	230	10	(3)	10
Asian	60	100	160	50	100	150	50	100	150	(3)	(3)	(3)
Other	330	510	480	270	470	450	270	460	450	30	20	20
Social scientists	3,470	6,650	8,110	2,990	6,190	7,470	2,900	5,960	7,220	310	400	610
White	3,170	6,030	7,280	2,750	5,620	6,700	2,660	5,410	6,470	280	390	560
Black	50	140	240	40	130	220	40	130	220	10	(3)	(3)
Asian	50	130	220	50	130	220	40	120	210	(3)	(3)	(3)
Other	200	340	370	160	320	330	160	300	330	20	10	40

[1] Detail may not add to total population because "No report" is not included.

[2] Includes American Indians and "No report."

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 14.–Doctoral women scientists and engineers by field, race, and employment status: 1973, 1977, and 1979

	Total employed											
	Employed in S/E			Employed in non-S/E			Postdoctorates			Unemployed, seeking		
Field and race	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	14,690	22,930	27,720	1,400	2,560	3,420	880	2,020	2,210	670	980	930
White	13,330	20,460	24,370	1,300	2,290	3,010	750	1,640	1,850	560	830	810
Black	220	420	640	30	70	120	10	30	30	(1)	10	20
Asian	530	940	1,620	30	70	130	80	300	270	80	100	90
Other[2]	620	1,110	1,090	40	130	160	30	40	50	20	40	20
Physical scientists	1,500	2,230	2,490	250	360	350	140	320	280	140	170	110
White	1,310	1,910	2,030	240	300	280	110	240	200	100	120	80
Black	20	30	30	(1)	10	10	(1)	(1)	(1)	(1)	(1)	(1)
Asian	120	220	360	10	20	40	20	70	80	30	40	40
Other	50	80	80	10	30	20	10	(1)	(1)	10	10	(1)
Mathematical scientists	730	970	1,050	50	70	80	(1)	10	10	20	30	30
White	650	840	890	50	70	80	(1)	10	10	20	30	20
Black	20	20	10	1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	40	60	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	10	(1)
Other	20	50	50	(1)	10	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Computer specialists	90	230	350	(1)	(1)	(1)	(1)	(1)	10	(1)	(1)	(1)
White	80	190	280	(1)	(1)	(1)	(1)	(1)	10	(1)	(1)	(1)
Black	(1)	(1)	10	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	(1)	20	60	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	(1)	20	20	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	240	400	560	10	10	10	10	30	40	(1)	20	10
White	230	370	520	10	10	10	10	20	30	(1)	20	10
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	10	20	20	(1)	(1)	(1)	(1)	10	10	(1)	(1)	(1)
Other	10	10	10	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Engineers	130	260	480	10	(1)	30	(1)	20	20	10	10	10
White	100	220	370	10	(1)	30	(1)	10	10	10	10	10
Black	(1)	(1)	10	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	20	30	80	(1)	(1)	(1)	(1)	10	10	(1)	(1)	(1)
Other	10	10	20	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Life scientists	5,140	7,110	9,000	380	540	660	600	1,330	1,480	260	330	350
White	4,690	6,330	7,780	350	480	610	530	1,060	1,270	220	280	300
Black	80	120	230	(1)	10	20	10	20	20	(1)	10	10
Asian	240	400	710	20	30	20	60	220	170	40	30	30
Other	130	270	290	20	20	10	10	30	30	(1)	10	20
Psychologists	4,420	6,850	8,160	280	620	830	90	180	230	130	200	170
White	4,050	6,180	7,470	250	570	690	80	160	220	130	170	170
Black	70	150	180	20	20	40	(1)	10	10	(1)	10	(1)
Asian	50	90	110	(1)	(1)	40	(1)	10	(1)	(1)	10	(1)
Other	230	430	390	10	30	60	10	(1)	10	10	10	(1)
Social scientists	2,450	4,870	5,630	420	950	1,460	30	140	140	100	230	250
White	2,230	4,420	5,040	400	850	1,310	30	140	120	90	210	230
Black	40	100	170	(1)	30	50	(1)	(1)	(1)	(1)	(1)	10
Asian	40	100	180	(1)	20	30	(1)	(1)	(1)	10	10	10
Other	150	240	240	10	60	70	(1)	(1)	10	(1)	20	10

[1] Too few cases to estimate.

[2] Includes American Indians and "No report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977–79) and unpublished data.

Appendix table 15.—Women scientists and engineers by field and race: 1978

Field	White	Black	Asian	Other[1]
All fields	242,100	13,800	7,800	2,400
Physical scientists	20,800	400	1,000	500
Chemists	17,100	400	1,000	500
Physicists/Astronomers	2,200	100	(2)	(2)
Other physical scientists	1,500	(2)	(2)	(2)
Mathematical scientists	18,200	1,000	(2)	600
Mathematicians	16,400	900	(2)	500
Statisticians	1,800	100	(2)	100
Computer specialists	39,800	100	2,800	(2)
Environmental scientists	8,100	400	200	(2)
Earth scientists	8,000	400	200	(2)
Oceanographers	(2)	(2)	(2)	(2)
Atmospheric scientists	100	(2)	(2)	(2)
Engineers	20,000	900	600	200
Life scientists	68,000	1,200	2,300	700
Biological scientists	39,300	1,100	2,000	500
Agricultural scientists	8,400	(2)	200	200
Medical scientists	20,400	100	100	100
Psychologists	33,400	2,400	(2)	200
Social scientists	33,800	7,500	900	100
Economists	6,500	(2)	100	(2)
Sociologists/Anthropologists	12,500	2,500	300	100
Other social scientists	14,700	4,900	500	(2)

[1] Includes American Indians, "Other", and "No report".

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304).

Appendix table 16.—Experienced[1] scientists and engineers by field, race, and S/E employment status: 1978

Field and race	Total employed					Employed in S/E					Employed in non-S/E				
	Total	White	Black	Asian	Other	Total	White	Black	Asian	Other	Total	White	Black	Asian	Other
All fields	880,600	846,000	9,300	20,300	4,900	842,800	809,400	8,700	19,800	4,800	37,800	36,600	600	400	100
Physical scientists	100,200	93,900	1,700	3,900	700	98,300	92,100	1,600	3,800	700	2,000	1,800	200	(2)	(2)
Chemists	70,000	65,200	1,600	2,500	700	68,400	63,800	1,500	2,500	700	1,600	1,400	200	(2)	(2)
Physicists/ Astronomers	25,200	23,900	100	1,200	(2)	24,900	23,600	100	1,200	(2)	300	300	(2)	(2)	(2)
Other physical scientists	5,100	4,800	(2)	200	(2)	5,000	4,700	(2)	200	(2)	100	100	(2)	(2)	(2)
Mathematical scientists	22,900	21,200	800	600	200	21,500	20,000	700	600	200	1,300	1,300	100	(2)	(2)
Mathematicians	17,100	16,100	700	300	(2)	15,900	15,000	600	300	(2)	1,200	1,100	100	(2)	(2)
Statisticians	5,800	5,200	100	400	100	5,600	5,000	100	400	100	100	100	(2)	(2)	(2)
Computer specialists	44,700	43,400	500	700	100	44,000	42,700	500	700	100	700	700	(2)	(2)	(2)
Environmental scientists	23,500	23,200	(2)	200	100	22,900	22,600	(2)	200	100	600	500	(2)	100	(2)
Earth scientists	19,600	19,400	(2)	100	100	19,100	18,900	(2)	100	100	600	500	(2)	100	(2)
Oceanographers	1,300	1,200	(2)	100	(2)	1,300	1,200	(2)	100	(2)	(2)	(2)	(2)	(2)	(2)
Atmospheric scientists	2,600	2,600	(2)	(2)	(2)	2,600	2,600	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Engineers	560,800	540,600	4,000	13,000	3,100	536,600	516,900	4,000	12,700	3,000	24,200	23,700	100	300	100
Life scientists	61,800	58,900	1,200	1,300	500	59,400	56,500	1,100	1,200	500	2,400	2,400	(2)	(2)	(2)
Biological scientists	30,200	28,200	900	700	400	28,900	26,900	900	700	400	1,300	1,300	(2)	(2)	(2)
Oceanographers	23,700	23,300	100	300	(2)	22,500	22,100	100	300	(2)	1,100	1,100	(2)	(2)	(2)
Medical scientists	8,000	7,400	200	300	100	8,000	7,400	200	300	100	(2)	(2)	(2)	(2)	(2)
Psychologists	29,100	28,500	500	(2)	100	27,300	26,800	400	(2)	100	1,800	1,700	(2)	(2)	(2)
Social scientists	37,500	36,300	600	500	100	32,800	31,800	400	500	100	4,700	4,500	200	(2)	(2)
Economists	14,700	14,200	100	400	100	13,000	12,500	100	400	100	1,700	1,700	(2)	(2)	(2)
Sociologists/ Anthropologists	9,300	8,800	300	100	(2)	7,900	7,600	200	100	(2)	1,400	1,200	200	(2)	(2)
Other social scientists	13,600	13,300	200	100	(2)	11,900	11,700	200	100	(2)	1,700	1,600	(2)	(2)	(2)

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322).

Appendix table 17.—Scientists and engineers by field, sex, and primary work activity: 1974, 1976 and 1978

	Total			Research			Development			Management of R&D			Management of other than R&D			Teaching			Other[1]		
Field and sex	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978
All fields	2,248,200	2,377,200	2,473,200	210,400	231,700	278,000	380,500	396,400	407,300	191,300	202,600	228,200	353,500	370,800	394,800	223,700	237,100	225,200	888,900	938,700	940,000
Men	2,072,100	2,179,900	2,241,700	180,500	197,600	230,700	371,500	386,100	393,500	181,600	192,000	218,400	338,900	354,600	377,700	188,800	202,300	179,900	811,000	847,6[illegible]	841,700
Women	176,100	197,200	231,500	29,800	34,100	47,300	9,000	10,100	13,800	9,700	10,500	9,800	14,600	16,300	17,100	34,800	34,800	45,200	78,000	91,300	98,300
Physical scientists	201,400	227,400	212,400	54,400	62,700	66,400	24,500	27,600	28,000	21,100	24,300	28,600	10,100	11,800	16,900	29,800	32,900	25,800	61,500	67,900	46,500
Men	185,500	207,500	197,400	48,900	55,400	59,700	22,900	25,900	26,400	20,800	23,700	28,000	9,700	11,300	16,300	27,900	31,000	24.400	55,300	60,200	42,600
Women	15,900	19,900	15,000	5,500	7,400	6,800	1,600	1,800	1,600	300	600	600	400	600	600	1,900	1,900	1,400	6,200	7,700	3,900
Mathematical scientists	82,800	88,300	88,400	4,800	5,500	12,900	6,200	6,700	3,600	5,400	5,800	6,800	6,000	6,600	8,600	25,000	28,200	29,300	35,400	35,500	27,600
Men	69,300	72,700	70,900	4,400	5,000	10,400	6,000	6,300	3,600	4,300	4,500	6,500	4,900	5,200	8,100	20,900	23,600	25,600	28,800	28,000	16,800
Women	13,500	15,600	17,500	400	500	2,300	200	400	(2)	1,100	1,300	300	1,100	1,300	500	4,100	4,700	3,700	6,600	7,500	10,800
Computer specialists	166,200	172,300	233,900	7,300	2,300	5,700	20,900	21,300	28,200	6,500	6,700	14,300	20,800	21,200	20,000	2,600	2,700	6,700	113,100	118,200	159,000
Men	134,900	138,700	193,400	1,900	2,000	5,300	17,300	17,500	23,700	5,800	5,900	13,200	17,800	18,100	18,500	2,200	2,300	5,600	89,900	92,900	127,100
Women	31,300	33,600	40,600	400	400	600	3,800	3,700	4,400	700	700	1,100	3,000	3,100	1,500	400	400	1,100	23,200	25,400	31,900
Environmental scientists	69,100	74,800	72,300	14,900	15,900	20,600	2,700	2,800	5,500	3,100	3,600	4,500	9,000	9,800	7,100	6,500	6,500	6,300	33,000	36,200	28,400
Men	64,800	71,100	64,600	13,300	14,700	17,700	2,500	2,700	5,300	3,000	3,500	4,200	8,900	9,700	7,100	6,000	6,100	5,900	31,100	34,400	24,400
Women	4,300	3,700	37,00	1,500	1,300	2,800	200	100	200	100	100	300	100	200	(2)	400	300	400	2,000	1,800	3,900
Engineers	1,212,600	1,240,700	1,268,400	48,300	49,500	50,300	319,900	328,100	327,800	118,400	120,800	125,20[illegible]	244,200	249,000	247,400	31,300	31,800	25,000	450,500	461,600	492,700
Men	1,208,300	1,234,000	1,248,500	47,900	48,800	48,300	318,200	325,900	373,700	118,100	120,500	123,8[illegible]0	243,800	248,500	246,800	31,300	31,800	25,000	449,000	458,700	481,100
Women	4,300	6,700	19,800	400	600	2,000	1,700	2,200	4,200	300	300	1,[illegible]00	400	500	600	(2)	(2)	100	1,400	2,800	11,600
Life scientists	238,600	277,500	291,000	59,400	67,000	89,400	2,400	4,800	9,300	16,100	19,200	2[illegible],500	23,200	29,900	47,300	42,700	46,600	56,100	94,800	110,000	66,500
Men	193,400	226,000	227,800	43,400	49,500	63,900	2,000	4,200	6,800	12,600	15,5[illegible]	19,300	21,100	27,200	42,300	32,700	37,000	37,500	81,700	92,800	57,900
Women	45,200	51,400	63,200	16,000	17,600	25,300	400	600	2,500	3,500	3,700	3.200	2.100	2,700	5,100	10,000	9,700	18,500	13,100	17,200	8,500
Psychologists	89,600	97,800	120,900	8,300	9,200	11,400	(2)	400	500	6,700	7,300	7,800	6,700	7,400	12,600	22,400	23,500	29,100	45,500	50,000	59,400
Men	71,[illegible]00	[illegible]	89,700	6,300	6,800	8,200	(2)	300	300	6,000	6,400	6,200	5,200	5,800	9,800	18,300	19,400	17,600	35,700	38,000	47,600
Women	18,100	21,100	31,200	2,000	2,400	3,200	(2)	100	200	700	900	1,600	1,500	1,600	2,800	4,100	4,100	11,500	9,800	12,000	11,800
Social scientists	187,900	198,300	186,000	18,000	19,400	21,600	3,900	4,700	4,400	14,000	14,800	18,500	33,500	35,200	34,900	62,700	64,900	46,900	55,800	59,300	60,000
Men	144,500	153,200	149,500	14,400	15,400	17,200	2,600	3,400	3,700	11,000	11,800	17,200	27,500	28,900	28,800	49,500	51,300	38,300	39,500	42,200	44,300
Women	43,400	45,200	36,500	3,600	4,000	4,400	1,300	1,300	700	3,000	3,000	1,300	6,000	6,300	6,100	13,200	13,600	8,600	16,300	17,000	15,400

[1] Includes consulting; production/inspection; reporting, statistical work, computing; "Other," and "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976–78).

Appendix table 18.—Scientists and engineers by field, sex, and primary work activity: 1978

Field and sex	Total	Research and development: Basic research	Research and development: Applied research	Research and development: Development	Management of R&D	Management of other than R&D	Teaching	Consulting	Production/ inspection	Reporting, stat. work, computing	Other and No report
All fields	2,473,200	132,400	145,600	407,300	228,200	394,800	225,200	122,800	353,200	307,000	157,000
Men	2,241,700	104,900	125,800	393,500	218,400	377,700	179,900	113,800	338,400	247,500	142,000
Women	231,500	27,500	19,800	13,800	9,800	17,100	45,200	8,900	14,900	59,500	15,000
Physical scientists	212,400	32,500	33,900	28,000	28,600	16,900	25,800	3,900	27,600	7,900	7,100
Men	197,400	28,300	31,400	26,400	28,000	16,300	24,400	3,300	25,500	7,100	6,700
Women	15,000	4,300	2,500	1,600	600	600	1,400	600	2,100	800	400
Mathematical scientists	88,400	7,300	5,400	3,600	6,800	8,600	29,300	1,800	2,600	20,900	2,300
Men	70,900	7,200	3,200	3,600	6,500	8,100	25,600	1,700	2,600	10,300	2,200
Women	17,500	100	2,200	(1)	300	500	3,700	(1)	(1)	10,600	200
Computer specialists	233,900	1,000	4,700	28,200	14,300	20,000	6,700	11,500	9,200	128,400	9,900
Men	193,400	1,000	4,300	23,700	13,200	18,500	5,600	9,800	8,500	101,700	7,100
Women	40,600	100	500	4,400	1,100	1,500	1,100	1,700	700	26,700	2,800
Environmental scientists	72,300	7,500	13,100	5,500	4,500	7,100	6,300	3,800	8,400	10,700	5,500
Men	64,600	6,800	10,900	5,300	4,200	7,100	5,900	3,800	7,000	8,400	5,200
Women	7,700	700	2,100	200	300	(1)	400	(1)	1,400	2,200	300
Engineers	1,268,400	8,500	41,800	327,800	125,200	247,400	25,000	67,500	257,300	94,400	73,500
Men	1,248,500	8,200	40,100	323,700	123,800	246,800	25,000	67,000	252,000	89,700	72,400
Women	19,800	300	1,700	4,200	1,300	600	100	500	5,300	4,700	1,100
Life scientists	291,000	59,500	29,900	9,300	22,500	47,300	56,100	7,700	33,400	9,100	16,300
Men	227,800	40,100	23,800	6,800	19,300	42,300	37,500	6,800	30,700	6,800	13,600
Women	63,200	19,300	6,000	2,500	3,200	5,100	18,500	900	2,600	2,400	2,600
Psychologists	120,900	4,000	7,400	500	7,800	12,600	29,100	18,100	6,000	10,200	25,100
Men	89,700	2,500	5,700	300	6,200	9,800	17,600	14,300	4,400	6,800	22,100
Women	31,200	1,500	1,700	200	1,600	2,800	11,500	3,900	1,500	3,400	3,000
Social scientists	186,000	12,100	9,400	4,400	18,500	34,900	46,900	8,500	8,800	25,400	17,300
Men	149,500	10,800	6,400	3,700	17,200	28,800	38,300	7,100	7,800	16,700	11,700
Women	36,500	1,400	3,000	700	1,300	6,100	8,600	1,300	1,000	8,600	4,500

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304).

Appendix table 19.—Doctoral scientists and engineers by field, sex, and primary work activity: 1973, 1977, and 1979

	Total		Research and development		Management of R&D		Management of other than R&D		Teaching		Consulting		Sales and professional services		Other	
Field	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
1973																
All fields	203,500	17,000	66,800	4,700	31,900	1,000	12,500	800	72,500	7,500	3,700	300	6,400	1,600	9,700	1,000
Physical scientists	46,600	1,900	19,300	600	8,600	100	2,100	100	13,400	900	400	(1)	500	(1)	2,200	200
Mathematical scientists	11,400	800	2,500	100	500	(1)	400	(1)	7,500	600	100	(1)	100	(1)	200	(1)
Computer specialists	2,600	100	1,000	(1)	400	(1)	200	(1)	900	(1)	100	(1)	(1)	(1)	100	(1)
Environmental scientists	10,100	300	3,600	100	1,900	(1)	600	(1)	3,000	100	300	(1)	(1)	(1)	600	(1)
Engineers	35,600	100	13,200	(1)	8,300	(1)	2,200	(1)	8,800	(1)	1,100	(1)	200	(1)	1,700	(1)
Life scientists	51,900	6,100	21,000	2,800	8,000	400	2,400	200	15,900	2,200	600	100	1,400	100	2,600	300
Psychologists	20,100	4,800	2,800	500	2,100	300	2,200	400	7,500	1,800	700	200	3,900	1,500	800	200
Social scientists	25,200	2,900	3,400	400	2,000	200	2,300	100	15,400	1,900	400	100	200	(1)	1,500	200
1977																
All fields	256,800	27,500	85,900	7,600	36,600	1,700	20,500	1,700	80,000	10,400	5,600	500	12,000	3,200	16,300	2,400
Physical scientists	54,600	2,900	23,600	1,200	9,600	200	3,300	100	13,600	1,100	400	(1)	1,000	100	3,100	200
Mathematical scientists	13,500	1,000	3,100	200	600	(1)	800	(1)	8,300	700	100	(1)	100	(1)	500	100
Computer specialists	5,500	200	2,500	100	900	(1)	500	(1)	1,100	100	100	(1)	100	(1)	300	(1)
Environmental scientists	12,600	400	4,700	200	1,900	100	1,100	(1)	3,400	100	400	(1)	100	(1)	1,000	(1)
Engineers	44,800	300	17,000	100	10,200	(1)	4,200	(1)	8,800	100	1,600	(1)	700	(1)	2,200	(1)
Life scientists	63,000	9,000	25,500	4,100	8,700	600	3,900	500	16,300	2,700	1,100	100	2,800	300	4,700	700
Psychologists	26,100	7,600	13,300	800	2,100	400	2,800	600	8,600	2,300	1,200	300	6,800	2,800	1,400	500
Social scientists	36,800	6,000	6,200	900	2,600	400	3,900	400	19,900	3,400	700	(1)	400	100	3,100	700
1979																
All fields	280,400	33,300	90,300	9,400	41,000	2,000	26,100	3,100	80,500	11,400	8,400	600	16,700	4,400	17,400	2,500
Physical scientists	57,000	3,100	22,700	1,300	12,300	300	3,400	200	13,400	1,000	700	(1)	1,100	(1)	3,400	300
Mathematical scientists	14,200	1,100	3,500	200	400	(1)	1,200	100	8,100	800	300	(1)	200	(1)	300	100
Computer specialists	6,400	400	2,900	200	900	(1)	700	(1)	1,100	100	300	(1)	100	(1)	400	100
Environmental scientists	14,000	600	5,300	300	2,300	100	1,200	100	2,800	100	800	(1)	200	(1)	1,300	100
Engineers	49,700	500	17,500	300	12,400	100	4,200	(1)	9,300	100	2,500	(1)	1,100	(1)	2,700	100
Life scientists	68,900	11,100	28,500	5,000	8,800	800	6,000	800	15,900	3,200	1,400	100	3,800	400	4,500	800
Psychologists	28,800	9,200	3,800	1,000	1,300	300	4,000	1,000	8,000	2,400	1,200	300	9,200	3,700	1,200	400
Social scientists	41,400	7,200	6,100	1,200	2,500	400	5,500	900	21,900	3,700	1,000	100	800	200	3,500	700

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79).

Appendix table 20.—Doctoral scientists and engineers by field, sex, and primary work activity: 1979

Field and sex	Total	Research and development			Management of R&D	Management of other than R&D	Teaching	Consulting	Sales and professional services	Other and No report
		Basic research	Applied research	Development						
All fields	313,700	47,900	36,800	15,000	43,000	29,200	91,900	9,000	21,000	19,800
Men	280,400	41,500	34,400	14,500	41,000	26,100	80,500	8,400	16,700	17,900
Women	33,300	6,400	2,400	500	2,000	3,100	11,400	600	4,400	2,500
Physical scientists	60,200	12,100	9,000	2,800	12,700	3,600	14,400	800	1,200	3,700
Men	57,000	11,200	8,700	2,700	12,300	3,400	13,400	700	1,100	3,400
Women	3,100	900	300	100	300	200	1,000	(1)	(1)	300
Mathematical scientists	15,300	2,100	1,100	500	500	1,300	8,900	400	200	400
Men	14,200	2,000	1,000	500	400	1,200	8,100	300	200	300
Women	1,100	100	(1)	(1)	(1)	100	800	(1)	(1)	100
Computer specialists	6,700	400	500	2,100	1,000	700	1,100	300	200	400
Men	6,400	400	500	2,000	900	700	1,100	300	100	400
Women	400	(1)	(1)	100	(1)	(1)	100	(1)	(1)	100
Environmental scientists	14,600	2,700	2,500	400	2,400	1,200	3,000	800	200	1,400
Men	14,000	2,500	2,400	400	2,300	1,200	2,800	800	200	1,300
Women	600	200	100	(1)	100	(1)	100	(1)	(1)	100
Engineers	50,200	1,900	8,000	7,800	12,500	4,200	9,300	2,600	1,100	2,700
Men	49,700	1,900	7,900	7,700	12,400	4,200	9,300	2,500	1,100	2,700
Women	500	100	100	100	100	(1)	100	(1)	(1)	100
Life scientists	80,100	23,400	9,200	900	9,500	6,800	19,200	1,600	4,200	5,400
Men	68,900	19,400	8,300	700	8,800	6,000	15,900	1,400	3,800	4,500
Women	11,100	4,000	900	200	800	800	3,200	100	400	800
Psychologists	38,000	2,600	2,000	300	1,600	5,000	10,400	1,500	13,000	1,600
Men	28,800	1,900	1,600	200	1,300	4,000	8,000	1,200	9,200	1,200
Women	9,200	600	400	(1)	300	1,000	2,400	300	3,700	400
Social scientists	48,000	2,700	4,500	200	3,000	6,400	25,600	1,100	1,000	4,200
Men	41,400	2,100	3,900	200	2,500	5,500	21,900	1,000	800	3,500
Women	7,200	600	600	(1)	400	900	3,700	100	200	700

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323) and unpublished data.

Appendix table 21.—Doctoral scientists and engineers by field, race, and primary work activity: 1973, 1977, and 1979

Field and race	Total	Research and development	Management of R&D	Management of other than R&D	Teaching	Consulting	Sales and professional services	Other and No report
				1973				
All fields	220,400	71,500	32,900	13,300	80,000	4,100	8,100	10,600
White	200,900	63,900	30,700	12,600	73,000	3,700	7,500	9,500
Black	2,100	400	300	200	900	(1)	100	100
Asian	9,100	4,400	1,000	100	2,800	200	200	400
Other[2]	8,300	2,600	900	400	3,300	100	400	600
Physical scientists	48,500	19,900	8,800	2,200	14,300	400	600	2,300
White	44,000	17,900	8,200	2,100	12,800	400	500	2,000
Black	500	100	100	(1)	200	(1)	(1)	(1)
Asian	2,100	1,200	300	(1)	500	(1)	(1)	100
Other	1,900	700	200	(1)	800	(1)	(1)	200
Mathematical scientists	12,100	2,600	500	500	8,100	100	100	300
White	11,000	2,300	500	400	7,300	100	100	200
Black	100	(1)	(1)	(1)	100	(1)	(1)	(1)
Asian	500	200	(1)	(1)	300	(1)	(1)	(1)
Other	500	200	(1)	(1)	300	(1)	(1)	(1)
Computer specialists	2,700	1,100	400	200	900	100	(1)	100
White	2,500	1,000	300	200	800	(1)	(1)	100
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	100	(1)	(1)	(1)	100	(1)	(1)	(1)
Environmental scientists	10,300	3,700	2,000	600	3,100	300	(1)	600
White	9,700	3,400	1,800	600	3,000	300	(1)	600
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	300	100	(1)	(1)	(1)	(1)	(1)	(1)
Other	400	200	100	(1)	100	(1)	(1)	(1)
Engineers	35,800	13,200	8,300	2,200	8,900	1,100	200	1,700
White	31,800	11,300	7,800	2,100	7,800	1,000	200	1,600
Black	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	2,700	1,500	300	(1)	700	100	(1)	100
Other	1,100	400	200	100	300	(1)	(1)	100
Life scientists	58,000	23,900	8,300	2,600	18,100	600	1,500	2,900
White	53,100	21,500	7,700	2,500	16,700	600	1,400	2,700
Black	700	200	100	(1)	300	(1)	(1)	(1)
Asian	2,300	1,300	300	(1)	500	(1)	100	100
Other	2,000	800	200	100	600	(1)	100	100
Psychologists	24,900	3,300	2,400	2,500	9,300	900	5,300	1,000
White	23,200	3,100	2,200	2,400	8,800	800	4,900	900
Black	300	(1)	100	(1)	100	(1)	100	(1)
Asian	200	(1)	(1)	(1)	100	(1)	(1)	(1)
Other	1,100	100	100	100	400	(1)	300	100
Social scientists	28,100	3,700	2,200	2,400	17,300	400	300	1,700
White	25,700	3,500	2,000	2,300	15,700	400	200	1,500
Black	400	(1)	100	100	200	(1)	(1)	(1)
Asian	900	100	100	(1)	700	(1)	(1)	100
Other	1,100	200	100	100	700	(1)	(1)	100
				1977				
All fields	284,300	93,500	38,300	22,200	90,400	6,100	15,200	18,600
White	253,600	80,300	35,200	20,600	81,600	5,500	14,000	16,400
Black	2,800	600	500	300	1,000	(1)	100	200
Asian	15,300	8,400	1,400	500	3,500	400	300	900
Other	12,600	4,100	1,300	800	4,400	200	800	1,100
Physical scientists	57,500	24,800	9,800	3,400	14,700	400	1,100	3,300
White	51,300	21,700	9,000	3,100	13,200	400	900	2,900
Black	600	200	200	(1)	100	(1)	100	(1)
Asian	3,200	2,000	300	100	600	(1)	(1)	200
Other	2,400	900	300	200	700	(1)	(1)	200
Mathematical scientists	14,600	3,300	600	800	9,100	100	100	600
White	12,900	2,800	500	700	8,100	100	100	500
Black	100	(1)	(1)	(1)	100	(1)	(1)	(1)
Asian	700	200	(1)	(1)	400	(1)	(1)	(1)
Other	800	200	(1)	(1)	500	(1)	(1)	(1)
Computer specialists	5,800	2,600	900	500	1,200	200	100	400
White	5,000	2,200	900	400	1,000	100	100	300
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	600	300	100	(1)	100	(1)	(1)	(1)
Other	200	100	(1)	(1)	100	(1)	(1)	(1)

Appendix table 21.—(con.)

Field and race	Total	Research and development	Management of R&D	Management of other than R&D	Teaching	Consulting	Sales and professional services	Other and No report
Environmental scientist	13,000	4,900	2,000	1,100	3,500	400	100	1,000
White	12,100	4,400	1,900	1,100	3,300	300	100	1,000
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	300	(1)	(1)	100	100	(1)	(1)
Other	400	200	100	(1)	100	(1)	(1)	(1)
Engineers	45,000	17,200	10,300	4,300	8,800	1,600	700	2,200
White	38,300	13,400	9,400	3,900	7,600	1,400	600	1,900
Black	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	4,800	2,900	500	200	800	200	(1)	300
Other	1,700	800	300	100	400	(1)	(1)	100
Life scientists	71,900	29,600	9,300	4,400	19,000	1,200	3,100	5,500
White	64,500	25,800	8,500	4,000	17,400	1,100	2,600	5,000
Black	800	200	100	100	200	(1)	(1)	100
Asian	3,800	2,300	400	100	500	(1)	200	200
Other	2,900	1,200	300	100	900	100	200	200
Psychologists	33,700	4,000	2,500	3,500	10,800	1,500	9,600	1,900
White	31,100	3,700	2,300	3,200	10,000	1,400	9,000	1,600
Black	500	100	100	(1)	200	(1)	(1)	100
Asian	300	(1)	(1)	(1)	100	(1)	100	(1)
Other	1,900	200	100	200	600	100	500	200
Social scientists	42,700	7,100	3,000	4,300	23,300	800	500	3,800
White	38,500	6,300	2,700	4,000	21,000	700	500	3,300
Black	600	100	100	100	300	(1)	(1)	100
Asian	1,400	300	100	(1)	800	(1)	(1)	100
Other	2,300	500	100	100	1,200	(1)	(1)	300
				1979				
All fields	313,700	99,700	43,000	29,200	91,900	9,000	21,000	19,800
White	276,900	86,400	36,800	26,900	82,100	7,600	19,500	17,500
Black	3,400	700	500	500	1,200	100	200	200
Asian	21,000	8,800	4,500	700	4,800	900	500	800
Other	12,400	3,700	1,200	1,100	3,800	400	800	1,300
Physical scientists	60,200	23,900	12,700	3,600	14,400	800	1,200	3,700
White	53,100	21,100	10,900	3,400	12,600	700	1,100	3,300
Black	500	200	100	(1)	100	(1)	(1)	(1)
Asian	4,300	1,800	1,400	100	900	(1)	100	100
Other	2,200	800	200	100	800	(1)	(1)	300
Mathematical scientists	15,300	3,600	500	1,300	8,900	400	200	400
White	13,200	3,000	400	1,200	7,900	300	200	300
Black	200	(1)	(1)	(1)	100	(1)	(1)	(1)
Asian	900	300	100	(1)	500	(1)	(1)	(1)
Other	1,000	300	(1)	100	400	100	(1)	100
Computer specialists	6,700	3,000	1,000	700	1,000	300	200	400
White	6,000	2,700	900	600	1,000	200	200	400
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	200	(1)	(1)	100	100	(1)	(1)
Other	300	100	(1)	100	100	(1)	(1)	(1)
Environmental scientists	14,600	5,600	2,400	1,200	3,000	800	200	1,400
White	13,600	5,100	2,200	1,200	2,800	700	200	1,300
Black	100	100	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	300	100	(1)	(1)	(1)	(1)	(1)
Other	500	200	100	(1)	100	100	(1)	(1)
Engineers	50,200	17,800	12,500	4,200	9,300	2,600	1,100	2,700
White	41,000	13,700	10,000	4,000	8,000	2,000	900	2,400
Black	200	(1)	100	(1)	(1)	(1)	(1)	(1)
Asian	7,500	3,500	2,100	100	900	600	100	200
Other	1,500	500	300	100	400	(1)	(1)	100
Life scientists	80,100	33,500	9,500	6,800	19,200	1,600	4,200	5,400
White	71,500	29,700	8,400	6,300	17,200	1,400	3,800	4,700
Black	900	200	100	100	400	(1)	(1)	(1)
Asian	4,900	2,500	700	200	900	100	300	300
Other	2,800	1,100	300	200	700	100	200	300

Appendix table 21.—(con.)

Field and race	Total	Research and development	Management of R&D	Management of other than R&D	Teaching	Consulting	Sales and professional services	Other and No report
Psychologists	38,000	4,800	1,600	5,000	10,400	1,500	13,000	1,600
White	35,100	4,500	1,500	4,500	9,700	1,300	12,200	1,500
Black	600	100	(1)	100	200	(1)	200	(1)
Asian	400	100	(1)	100	100	(1)	100	(1)
Other	1,900	200	200	300	400	100	600	100
Social scientists	48,600	7,400	3,000	6,400	25,600	1,100	1,000	4,200
White	43,400	6,600	2,600	5,800	22,800	900	900	3,800
Black	1,000	100	100	200	400	(1)	(1)	100
Asian	2,000	200	100	200	1,400	100	(1)	100
Other	2,200	500	200	200	1,000	(1)	(1)	200

[1] Too few cases to estimate.

[2] Includes American Indians and "No report."

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 22.—Doctoral scientists and engineers by field, race, and primary work activity: 1979

Field and race	Total	Research and development			Management of R&D	Management of other than R&D	Teaching	Consulting	Sales and professional services	Other and No report
		Basic research	Applied research	Development						
All fields	313,700	47,900	36,800	15,000	43,000	29,200	91,900	9,000	21,000	19,800
White	276,900	42,200	31,900	12,300	36,800	26,900	82,100	7,600	19,500	17,500
Black	3,400	300	400	(1)	500	500	1,200	100	200	200
Asian	21,000	3,400	3,300	2,100	4,500	700	4,800	900	500	800
Other[2]	12,400	1,900	1,300	500	1,200	1,100	3,800	400	800	1,300
Physical scientists	60,200	12,100	9,000	2,800	12,700	3,600	14,400	800	1,200	3,700
White	53,100	10,500	8,200	2,400	10,900	3,400	12,600	700	1,100	3,300
Black	500	100	100	(1)	100	(1)	100	(1)	(1)	(1)
Asian	4,300	1,000	500	300	1,400	100	900	(1)	100	100
Other	2,200	500	300	100	200	100	800	(1)	(1)	300
Mathematical scientists	15,300	2,100	1,100	500	500	1,300	8,900	400	200	400
White	13,200	1,700	1,000	400	400	1,200	7,900	300	200	300
Black	200	(1)	(1)	(1)	(1)	(1)	100	(1)	(1)	(1)
Asian	900	200	100	100	100	(1)	500	(1)	(1)	(1)
Other	1,000	200	(1)	(1)	(1)	100	400	100	(1)	100
Computer specialists	6,700	400	500	2,100	1,000	700	1,100	300	200	400
White	6,000	400	400	1,800	900	600	1,000	200	200	400
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	(1)	(1)	200	(1)	(1)	100	100	(1)	(1)
Other	300	(1)	(1)	100	(1)	100	100	(1)	(1)	(1)
Environmental scientists	14,600	2,700	2,500	400	2,400	1,200	3,000	800	200	1,400
White	13,600	2,500	2,300	300	2,200	1,200	2,800	700	200	1,300
Black	100	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	100	100	100	100	(1)	(1)	(1)	(1)	(1)
Other	500	100	(1)	(1)	100	(1)	100	100	(1)	(1)
Engineers	50,200	1,900	8,000	7,800	12,500	4,200	9,300	2,600	1,100	2,700
White	41,000	1,600	6,000	6,100	10,000	4,000	8,000	2,000	900	2,400
Black	200	(1)	(1)	(1)	100	(1)	(1)	(1)	(1)	(1)
Asian	7,500	300	1,700	1,400	2,100	100	900	600	100	200
Other	1,500	(1)	300	300	300	100	400	(1)	(1)	100
Life scientists	80,100	23,400	9,200	900	9,500	6,800	19,200	1,600	4,200	5,400
White	71,500	20,800	8,100	800	8,400	6,300	17,200	1,400	3,800	4,700
Black	900	200	100	(1)	100	100	400	(1)	(1)	(1)
Asian	4,900	1,700	700	(1)	700	200	900	100	300	300
Other	2,800	700	400	(1)	300	200	700	100	200	300
Psychologists	38,000	2,600	2,000	300	1,600	5,000	10,400	1,500	13,000	1,600
White	35,100	2,300	1,900	300	1,500	4,500	9,700	1,300	12,200	1,500
Black	600	(1)	(1)	(1)	(1)	100	200	(1)	200	(1)
Asian	400	(1)	(1)	(1)	(1)	100	100	(1)	100	(1)
Other	1,900	200	(1)	(1)	200	300	400	100	600	100
Social scientists	48,600	2,700	4,500	200	3,000	6,400	25,600	1,100	1,000	4,200
White	43,400	2,400	4,000	200	2,600	5,800	22,800	900	900	3,800
Black	1,000	(1)	100	(1)	100	200	400	(1)	(1)	100
Asian	2,000	(1)	100	(1)	100	200	1,400	100	(1)	100
Other	2,200	200	300	(1)	200	200	1,000	(1)	(1)	200

[1] Too few cases to estimate.

[2] Includes American Indians and "No report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 23.—Experienced[1] scientists and engineers by field, race, and primary work activity: 1978

		Research and development				Management						
Field and race	Total	Total	Basic research	Applied research	Development	Management of R&D	of other than R&D	Teaching	Consulting	Production/ inspection	Reporting[2]	Other and No report
All fields	880,600	243,400	28,100	52,600	162,700	106,800	170,700	75,000	49,500	117,300	64,000	54,000
White	846,000	230,600	25,900	49,300	155,400	103,700	166,100	71,000	48,000	113,300	61,200	52,000
Black	9,300	2,000	300	700	1,000	1,100	1,800	1,500	400	1,000	900	600
Asian	20,300	9,200	1,500	2,500	5,300	1,500	2,300	1,800	800	2,200	1,400	1,000
Other	4,900	1,500	300	200	1,000	500	500	600	300	700	400	400
Physical scientists	100,200	41,300	12,200	16,100	13,000	16,800	9,600	14,300	2,000	10,400	2,600	3,400
White	93,900	38,000	11,100	14,700	12,200	16,300	9,100	13,600	1,900	9,500	2,400	3,100
Black	1,700	500	100	300	100	100	400	200	(3)	400	100	100
Asian	3,900	2,400	900	900	600	400	100	400	100	200	200	100
Other	700	400	100	100	100	(3)	(3)	(3)	(3)	300	(3)	(3)
Mathematical scientists	22,900	3,200	1,300	1,000	900	2,600	3,000	8,600	400	700	3,800	700
White	21,200	3,000	1,200	1,000	900	2,500	2,900	8,000	400	600	3,300	600
Black	800	(3)	(3)	(3)	(3)	100	100	300	(3)	100	200	(3)
Asian	600	200	100	(3)	(3)	(3)	(3)	200	(3)	(3)	200	(3)
Other	200	(3)	(3)	(3)	(3)	(3)	100	100	(3)	(3)	(3)	(3)
Computer specialists	44,700	6,900	200	1,100	5,500	3,600	6,100	1,900	3,200	1,800	19,400	1,900
White	43,400	6,800	200	1,100	5,400	3,500	5,900	1,800	3,200	1,700	18,700	1,800
Black	500	(3)	(3)	(3)	(3)	100	100	(3)	(3)	(3)	300	(3)
Asian	700	100	(3)	(3)	100	(3)	100	(3)	(3)	100	400	(3)
Other	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100	(3)
Environmental scientists	23,500	7,600	1,700	4,100	1,900	2,400	3,700	2,800	1,500	1,800	1,700	2,000
White	23,200	7,500	1,600	4,000	1,900	2,300	3,700	2,800	1,500	1,800	1,600	2,000
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	200	100	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100	(3)
Other	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100
Engineers	560,800	159,300	2,900	18,400	138,000	69,400	125,600	13,500	32,300	94,700	30,000	36,100
White	540,600	151,600	2,800	17,100	131,700	67,300	122,200	12,600	31,100	92,000	29,000	34,700
Black	4,000	1,000	(3)	200	800	700	1,000	200	100	500	200	300
Asian	13,000	5,700	(3)	1,100	4,600	900	2,000	500	700	1,800	600	800
Other	3,100	900	(3)	100	800	400	300	200	300	400	200	300
Life scientists	61,800	17,700	7,500	8,000	2,200	5,600	11,900	14,400	2,100	4,900	2,400	2,900
White	58,900	16,300	6,800	7,400	2,100	5,400	11,700	13,600	2,000	4,800	2,300	2,800
Black	1,200	300	100	100	100	100	100	500	(3)	(3)	100	100
Asian	1,300	800	300	400	(3)	100	(3)	200	100	(3)	(3)	(3)
Other	500	200	200	(3)	(3)	100	(3)	200	(3)	(3)	(3)	(3)
Psychologists	29,100	2,800	900	1,400	500	2,300	4,100	7,400	6,500	1,000	700	4,300
White	28,500	2,700	800	1,400	500	2,300	4,100	7,200	6,300	1,000	700	4,200
Black	500	100	100	(3)	(3)	(3)	100	100	200	(3)	(3)	(3)
Asian	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Other	100	(3)	(3)	(3)	(3)	(3)	(3)	100	(3)	(3)	(3)	(3)
Social scientists	37,500	4,700	1,500	2,500	700	4,100	6,700	12,100	1,700	2,100	3,400	2,800
White	36,300	4,600	1,500	2,500	700	4,000	6,500	11,500	1,600	2,000	3,200	2,700
Black	600	(3)	(3)	(3)	(3)	(3)	100	200	(3)	100	(3)	100
Asian	500	(3)	(3)	(3)	(3)	100	(3)	400	(3)	(3)	(3)	(3)
Other	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100	(3)

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

[2] Includes statistical work and computer application.

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322).

Appendix table 24.—Scientists and engineers by field, sex, and type of employer: 1974, 1976, and 1978

Field and sex	Total 1974	Total 1976	Total 1978	Business and industry 1974	Business and industry 1976	Business and industry 1978	Educational institutions 1974	Educational institutions 1976	Educational institutions 1978	Federal government 1974	Federal government 1976	Federal government 1978	Other [1] 1974	Other [1] 1976	Other [1] 1978
All fields	2,248,200	2,377,200	2,473,200	1,376,200	1,433,100	1,528,100	341,300	370,700	380,800	189,100	205,600	205,800	341,500	367,800	358,400
Men	2,072,100	2,179,900	2,241,700	1,313,800	1,362,600	1,445,300	288,200	312,100	304,800	175,500	189,700	187,300	294,500	315,600	304,600
Women	176,100	197,200	231,500	62,400	70,500	82,700	53,100	58,600	76,000	13,600	15,900	18,600	47,000	52,200	54,000
Physical scientists	201,400	227,400	212,400	98,000	108,700	116,300	47,400	54,100	55,500	19,600	22,800	18,000	36,400	41,700	22,600
Men	185,500	207,500	197,400	89,300	99,000	108,400	44,200	49,400	51,500	18,800	21,100	16,900	33,200	38,000	20,500
Women	15,900	19,900	15,000	8,700	9,700	7,900	3,200	4,700	4,000	800	1,800	1,100	3,200	3,900	2,100
Mathematical scientists	82,800	88,300	88,400	32,000	33,600	34,200	31,900	34,600	35,100	7,900	8,700	9,400	11,000	11,300	9,700
Men	69,300	72,700	70,900	27,000	27,900	25,600	28,100	29,800	28,600	6,100	6,600	8,800	8,100	8,400	7,800
Women	13,500	15,600	17,500	5,000	5,700	8,600	3,800	4,800	6,500	1,800	2,100	600	2,900	3,000	1,800
Computer specialists	166,200	172,300	233,900	121,600	125,900	173,000	13,400	13,800	17,900	13,900	14,300	14,600	17,300	18,200	28,800
Men	134,900	138,700	193,400	99,100	101,600	145,100	10,600	10,900	13,900	11,300	11,600	12,300	13,900	14,600	22,300
Women	31,300	33,600	40,600	22,500	24,300	27,800	2,800	2,900	4,000	2,600	2,800	2,300	3,400	3,800	6,600
Environmental scientists	69,100	74,800	72,300	36,200	40,400	40,400	10,100	11,100	12,900	10,600	11,100	10,400	12,100	12,200	8,600
Men	64,800	71,100	64,600	34,800	38,900	36,000	9,100	10,500	11,300	9,600	10,500	9,500	11,200	11,200	7,900
Women	4,300	3,700	7,700	1,400	1,500	4,400	1,000	600	1,600	1,000	600	900	900	900	700
Engineers	1,212,600	1,240,700	1,268,400	939,600	959,700	985,400	43,100	43,900	48,700	95,100	97,500	90,600	134,800	139,500	143,700
Men	1,208,300	1,234,000	1,248,500	936,700	955,100	969,100	42,900	43,600	47,700	94,700	96,900	89,200	134,000	138,400	142,500
Women	4,300	6,700	19,800	2,900	4,600	16,300	200	300	900	400	700	1,400	800	1,100	1,200
Life scientists	238,600	277,500	291,000	89,500	102,000	86,400	75,300	86,100	94,400	17,900	25,600	41,800	55,900	63,700	68,200
Men	193,400	226,000	227,800	78,000	88,300	77,300	56,300	65,500	65,500	16,000	23,100	35,500	43,100	49,000	49,600
Women	45,200	51,400	63,200	11,500	13,700	9,100	19,000	20,700	28,900	1,900	2,500	6,400	12,800	14,600	18,200
Psychologists	89,600	97,800	120,900	17,700	18,700	31,600	39,300	42,900	55,300	5,100	5,400	4,000	27,500	30,700	29,900
Men	71,500	76,700	89,700	14,100	14,800	28,500	33,700	36,100	36,000	4,500	4,700	3,100	19,200	21,200	22,100
Women	18,100	21,100	31,200	3,600	3,900	3,000	5,600	6,700	19,400	600	700	900	8,300	9,600	7,900
Social scientists	187,900	198,300	186,000	41,600	44,100	60,800	80,800	84,300	61,200	19,000	20,000	17,000	46,500	49,900	46,700
Men	144,500	153,200	149,500	34,800	37,000	55,300	63,300	66,300	50,200	14,500	15,300	12,000	31,800	24,600	31,900
Women	43,400	45,200	36,500	6,800	7,100	5,600	17,500	17,900	11,100	4,500	4,700	5,000	14,700	15,400	14,900

[1] Includes nonprofit organizations; military; State, local, and other governments; and "No report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers (biennial series, 1976-78).

Appendix table 25.—Scientists and engineers by field, sex, and type of employer: 1978

Field and sex	Total	Business and industry	Educational institutions	Nonprofit organizations	Federal government	Military	State and local governments	Other government	Other and No report
All fields	2,473,200	1,528,100	380,800	80,000	205,800	20,600	145,300	58,300	54,200
Men	2,241,700	1,445,300	304,800	60,500	187,300	20,300	122,400	55,500	45,900
Women	231,500	82,700	76,000	19,600	18,600	200	23,000	2,800	8,400
Physical scientists	212,400	116,300	55,500	7,900	18,000	700	5,200	4,400	4,400
Men	197,400	108,400	51,500	7,000	16,900	700	4,600	4,100	4,100
Women	15,000	7,900	4,000	900	1,100	(1)	600	300	300
Mathematical scientists	88,400	34,200	35,100	3,100	9,400	800	3,300	1,500	1,000
Men	70,900	25,600	28,600	2,600	8,800	700	2,300	1,300	900
Women	17,500	8,600	6,500	500	600	(1)	1,000	200	100
Computer specialists	233,900	173,000	17,600	11,100	14,600	2,900	6,800	3,700	4,300
Men	193,400	145,100	13,700	9,000	12,300	2,700	4,100	3,500	3,000
Women	40,600	27,800	4,000	2,000	2,300	200	2,700	300	1,300
Environmental scientists	72,300	40,400	12,900	1,100	10,400	100	4,900	1,800	700
Men	64,600	36,000	11,300	1,000	9,500	100	4,400	1,700	700
Women	7,700	4,400	1,600	100	900	(1)	500	100	(1)
Engineers	1,268,400	985,400	48,700	17,900	90,600	11,600	52,900	34,700	26,600
Men	1,248,500	969,100	47,700	17,800	89,200	11,600	52,600	34,300	26,200
Women	19,800	16,300	900	100	1,400	(1)	300	400	400
Life scientists	291,000	86,400	94,400	18,500	41,800	1,800	31,400	4,200	12,300
Men	227,800	77,300	65,500	9,700	35,500	1,800	27,700	3,500	6,900
Women	63,200	9,100	28,900	8,900	6,400	(1)	3,800	700	5,400
Psychologists	120,900	31,600	55,300	10,200	4,000	2,200	13,200	1,700	2,700
Men	89,700	28,500	36,000	7,800	3,100	2,200	8,700	1,300	2,000
Women	31,200	3,000	19,400	2,400	900	(1)	4,500	400	700
Social scientists	186,000	60,800	61,300	10,200	17,000	500	27,600	6,200	2,200
Men	149,500	55,300	50,200	5,600	12,000	500	18,000	5,700	2,100
Women	36,500	5,600	11,100	4,600	5,000	(1)	9,600	500	200

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304).

Appendix table 26.—Doctoral scientists and engineers by field, sex, and type of employer: 1973, 1977, and 1979

	Total			Business and industry			Educational institutions			Federal government			Other [1]		
Field and sex	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	220,400	284,300	313,700	53,400	71,500	82,800	129,400	163,100	174,000	18,200	21,400	23,900	19,400	28,300	33,000
Men	203,500	256,800	280,400	52,000	68,500	78,200	117,200	144,400	152,100	17,200	20,100	22,300	16,900	23,800	27,800
Women	17,000	27,500	33,300	1,400	3,000	4,600	12,200	18,800	21,900	1,000	1,300	1,600	2,500	4,500	5,300
Physical scientists	48,500	57,500	60,200	19,700	23,000	25,000	22,000	27,100	27,200	4,100	3,900	4,600	2,700	3,400	3,300
Men	46,600	54,600	57,000	19,300	22,300	24,200	20,700	25,300	25,400	4,000	3,700	4,400	2,600	3,200	3,000
Women	1,900	2,900	3,100	300	600	800	1,300	1,800	1,800	100	200	200	100	300	300
Mathematical scientists	12,100	14,600	15,300	900	1,300	1,400	10,500	12,200	12,600	500	600	800	300	500	400
Men	11,400	13,500	14,200	800	1,200	1,400	9,700	11,300	11,700	500	600	800	300	400	400
Women	800	1,000	1,100	(2)	100	100	700	900	1,000	(2)	(2)	(2)	(2)	(2)	100
Computer specialists	2.700	5,800	6,700	1,000	3,100	3,700	1,400	2,100	2,500	100	300	300	200	300	300
Men	2,600	5,500	6,400	1,000	3,000	3,500	1,300	2,000	2,300	100	200	300	200	300	300
Women	100	200	400	(2)	100	200	(2)	100	100	(2)	(2)	(2)	(2)	(2)	(2)
Environmental scientists	10,300	13,000	14,600	2,200	3,100	4,200	5,200	6,300	6,200	2,000	2,400	2,700	1,000	1,200	1,500
Men	10,100	12,600	14,000	2,200	3,000	4,100	5,000	6,000	5,900	1,900	2,400	2,600	900	1,200	1,400
Women	300	400	600	(2)	100	100	200	300	300	(2)	100	100	(2)	(2)	100
Engineers	35,800	45,000	50,200	17,800	22,900	26,400	13,000	15,900	17,000	2,700	3,500	3,600	2,300	2,700	3,200
Men	35,600	44,800	49,700	17,700	22,800	26,200	13,000	15,800	16,900	2,700	3,500	3,500	2,300	2,700	3,100
Women	100	300	500	100	100	300	100	100	200	(2)	(2)	(2)	(2)	(2)	(2)
Life scientists	58,000	71,900	80,100	7,200	10,100	11,500	39,200	47,500	52,200	6,100	6,800	7,500	5,500	7,600	8,400
Men	51,900	63,000	68,900	6,900	9,500	10,600	34,700	40,900	44,100	5,600	6,200	6,800	4,700	6,400	7,500
Women	6,100	9,000	11,100	300	600	900	4,600	6,600	8,100	500	600	700	700	1,300	1,400
Psychologists	24,900	33,700	38,000	3,100	5,500	7,100	15,100	18,600	19,900	1,200	1,200	1,100	5,400	8,400	9,900
Men	20,100	26,100	28,800	2,600	4,400	5,300	12,200	14,400	15,200	1,000	1,100	900	4,200	6,300	7,400
Women	4,800	7,600	9,200	500	1,200	1,800	2,900	4,200	4,800	200	100	200	1,300	2,100	2,500
Social scientists	28,100	42,700	48,600	1,600	2,600	3,500	23,000	33,400	36,300	1,500	2,600	3,300	2,000	4,100	5,600
Men	25,200	36,800	41,400	1,500	2,300	3,000	20,600	28,700	30,700	1,300	2,400	2,900	1,800	3,400	4,700
Women	2,900	6,000	7,200	100	200	400	2,400	4,800	5,500	100	200	400	300	700	900

[1] Includes hospitals and clinics; nonprofit organizations; military; State government; other government; and "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79).

Appendix table 27.—Doctoral scientists and engineers by field, sex, and type of employer: 1979

Field and sex	Total	Business and industry	Educational institutions	Hospitals and clinics	Nonprofit organizations	Federal government	Military	State government	Other governments	Other and No report
All fields	313,700	82,800	174,000	9,700	12,500	23,900	2,300	4,200	1,900	2,300
Men	280,400	78,200	152,100	7,800	10,700	22,300	2,300	3,400	1,500	2,100
Women	33,300	4,600	21,900	1,900	1,900	1,600	100	800	400	200
Physical scientists	60,200	25,000	27,200	500	2,000	4,600	200	100	100	300
Men	57,000	24,200	25,400	400	1,800	4,400	200	100	100	300
Women	3,100	800	1,800	100	100	200	(1)	(1)	(1)	(1)
Mathematical scientists	15,300	1,400	12,600	(1)	300	800	(1)	(1)	(1)	(1)
Men	14,200	1,400	11,700	(1)	300	800	(1)	(1)	(1)	(1)
Women	1,100	100	1,000	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Computer specialists	6,700	3,700	2,500	(1)	200	300	100	(1)	(1)	(1)
Men	6,400	3,500	2,300	(1)	200	300	100	(1)	(1)	(1)
Women	400	200	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	14,600	4,200	6,200	(1)	600	2,700	100	600	100	100
Men	14,000	4,100	5,900	(1)	600	2,600	100	500	100	100
Women	600	100	300	(1)	100	100	(1)	(1)	(1)	(1)
Engineers	50,200	26,400	17,000	100	2,000	3,600	600	100	100	200
Men	49,700	26,200	16,900	100	2,000	3,500	600	100	100	200
Women	500	300	200	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Life scientists	80,100	11,500	52,200	3,200	3,000	7,500	600	1,300	300	500
Men	68,900	10,600	44,100	2,800	2,400	6,800	600	1,100	200	400
Women	11,100	900	8,100	400	600	700	(1)	200	100	100
Psychologists	38,000	7,100	19,900	5,900	1,700	1,100	200	1,000	700	300
Men	28,800	5,300	15,200	4,500	1,100	900	200	700	500	200
Women	9,200	1,800	4,800	1,400	600	200	(1)	300	200	100
Social scientists	48,600	3,500	36,300	(1)	2,800	3,300	300	1,000	600	800
Men	41,400	3,000	30,700	(1)	2,400	2,900	300	800	500	700
Women	7,200	400	5,500	(1)	400	400	(1)	200	100	100

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 28.—Doctoral scientists and engineers by field, race, and type of employer: 1973, 1977, and 1979

	Total			Business and industry			Educational institutions			Federal government			Other [1]		
	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	220,400	284,300	313,700	53,400	71,500	82,800	129,400	163,100	174,000	18,200	21,400	23,900	19,400	28,300	33,000
White	200,900	253,600	276,900	48,800	62,600	70,800	117,400	146,200	154,600	17,000	19,400	21,800	17,700	25,300	29,600
Black	2,100	2,800	3,400	300	400	400	1,400	1,800	2,200	200	300	400	200	300	500
Asian	9,100	15,300	21,000	2,700	5,800	8,800	5,200	7,400	9,900	500	800	1,000	800	1,300	1,400
Other[2]	8,300	12,600	12,400	1,500	2,600	2,800	5,500	7,800	7,300	500	900	800	800	1,400	1,500
Physical scientists	48,500	57,500	60,200	19,700	23,000	25,000	22,000	27,100	27,200	4,100	3,900	4,600	2,700	3,400	3,300
White	44,000	51,300	53,100	18,300	20,700	22,100	19,500	24,100	24,000	3,800	3,600	4,100	2,400	3,000	2,900
Black	500	600	500	200	200	200	300	300	200	100	100	100	(3)	(3)	(3)
Asian	2,100	3,200	4,300	700	1,300	2,100	1,100	1,400	1,800	100	200	300	200	300	200
Other	1,900	2,400	2,200	500	700	700	1,100	1,300	1,300	100	100	100	100	200	200
Mathematical scientists	12,100	14,600	15,300	900	1,300	1,400	10,500	12,200	12,600	500	600	800	300	500	400
White	11,006	12,900	13,200	800	1,200	1,300	9,400	10,800	10,800	500	500	700	300	400	400
Black	100	100	200	(3)	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)	(3)
Asian	500	700	900	(3)	100	100	500	600	900	(3)	(3)	(3)	(3)	(3)	(3)
Other	500	800	1,000	(3)	(3)	100	500	700	800	(3)	(3)	100	(3)	(3)	(3)
Computer specialists	2,700	5,800	6,700	1,000	3,100	3,700	1,400	2,100	2,500	100	300	300	200	300	300
White	2,500	5,000	6,000	900	2,600	3,200	1,300	1,800	2,200	100	200	300	200	300	300
Black	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100	600	500	(3)	400	300	(3)	200	100	(3)	(3)	(3)	(3)	(3)	(3)
Other	100	200	300	(3)	100	200	100	100	100	(3)	(3)	(3)	(3)	(3)	(3)
Environmental scientists	10,300	13,000	14,600	2,200	3,100	4,200	5,200	6,300	6,200	2,000	2,400	2,700	1,000	1,200	1,500
White	9,700	12,100	13,600	2,100	2,800	3,900	4,900	5,900	5,800	1,800	2,200	2,600	900	1,200	1,300
Black	(3)	(3)	100	(3)	(3)	100	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	300	500	500	100	200	200	100	200	200	(3)	100	100	(3)	(3)	(3)
Other	400	400	500	100	100	200	200	200	200	100	100	(3)	(3)	(3)	100
Engineers	35,800	45,000	50,200	17,800	22,900	26,400	13,000	15,900	17,000	2,700	3,500	3,600	2,300	2,700	3,200
White	31,800	38,300	41,000	15,800	19,100	20,500	11,500	13,800	14,700	2,500	3,100	3,200	2,000	2,400	2,700
Black	100	100	200	(3)	(3)	(3)	100	100	100	(3)	(3)	(3)	(3)	(3)	(3)
Asian	2,700	4,800	7,500	1,500	3,000	5,200	1,000	1,300	1,600	100	200	300	100	300	300
Other	1,100	1,700	1,500	400	700	700	500	800	600	100	200	100	100	100	100
Life scientists	58,000	71,900	80,100	7,200	10,100	11,500	39,200	47,500	52,200	6,100	6,800	7,500	5,500	7,600	8,900
White	53,100	64,500	71,500	6,700	8,900	10,300	35,800	42,700	46,300	5,700	6,200	6,900	4,900	6,700	8,000
Black	700	800	900	100	100	(3)	500	500	600	100	100	100	100	100	100
Asian	2,300	3,800	4,900	300	700	800	1,500	2,300	3,400	200	200	200	300	500	500
Other	2,000	2,900	2,800	200	400	400	1,400	1,900	1,900	200	200	200	100	400	300
Psychologists	24,900	33,700	38,000	3,100	5,500	7,100	15,100	18,600	19,900	1,200	1,200	1,100	5,400	8,400	9,900
White	23,200	31,100	35,100	2,800	5,100	6,500	14,100	17,100	18,500	1,200	1,100	1,000	5,100	7,800	9,100
Black	300	500	600	(3)	(3)	100	200	400	400	(3)	(3)	(3)	(3)	100	200
Asian	200	300	400	(3)	(3)	100	100	200	200	(3)	(3)	(3)	100	100	100
Other	1,100	1,900	1,900	200	400	500	700	1,000	800	(3)	100	100	300	500	500
Social scientists	28,100	42,700	48,600	1,600	2,600	3,500	23,000	33,400	36,300	1,500	2,600	3,300	2,000	4,100	5,600
White	25,700	38,500	43,400	1,500	2,300	3,200	21,000	30,100	32,400	1,400	2,400	3,000	1,900	3,600	4,900
Black	400	600	1,000	(3)	(3)	(3)	300	500	700	(3)	(3)	100	(3)	100	100
Asian	1,000	1,400	2,000	(3)	100	100	800	1,100	1,700	(3)	100	(3)	100	100	200
Other	1,100	2,300	2,200	100	100	100	1,000	1,700	1,500	(3)	100	200	100	300	400

[1] Includes hospitals and clinics; nonprofit organizations; military; State government; other governments; and "No report."

[2] Includes American Indians and "No report."

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79).

Appendix table 29.—Doctoral scientists and engineers by field, race, and type of employer: 1979

Field and race	Total	Business and industry	Educational institutions	Hospitals and clinics	Nonprofit organizations	Federal government	Military	State government	Other governments	Other and No report
All fields	313,700	82,800	174,000	9,700	12,500	23,900	2,300	4,200	1,900	2,300
White	276,900	70,800	154,600	8,800	11,300	21,800	2,200	3,800	1,700	1,900
Black	3,400	400	2,200	200	200	400	(1)	(1)	100	100
Asian	21,000	8,800	9,900	300	600	1,000	(1)	(200	100	200
Other[2]	12,400	2,800	7,300	400	500	800	100	100	200	200
Physical scientists	60,200	25,000	27,200	500	2,000	4,600	200	100	100	300
White	53,100	22,100	24,000	400	1,800	4,100	200	100	100	300
Black	500	200	200	(1)	(1)	100	(1)	(1)	(1)	(1)
Asian	4,300	2,100	1,800	(1)	100	300	(1)	(1)	(1)	(1)
Other	2,200	700	1,300	(1)	100	100	(1)	(1)	(1)	(1)
Mathematical scientists	15,300	1,400	12,600	(1)	300	800	(1)	(1)	(1)	(1)
White	13,200	1,300	10,800	(1)	300	700	(1)	(1)	(1)	(1)
Black	200	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	900	100	900	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	1,000	100	800	(1)	(1)	100	(1)	(1)	(1)	(1)
Computer specialist	6,700	3,700	2,500	(1)	200	300	100	(1)	(1)	(1)
White	6,000	3,200	2,200	(1)	200	300	100	(1)	(1)	(1)
Black	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	300	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	300	200	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	14,600	4,200	6,200	(1)	600	2,700	100	600	100	100
White	13,600	3,900	5,800	(1)	600	2,600	100	500	100	(1)
Black	100	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	500	200	200	(1)	(1)	100	(1)	(1)	(1)	(1)
Other	500	200	200	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Engineers	50,200	26,400	17,000	100	2,000	3,600	600	100	100	200
White	41,000	20,500	14,700	100	1,700	3,200	600	100	100	200
Black	200	(1)	100	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Asian	7,500	5,200	1,600	(1)	200	300	(1)	100	(1)	100
Other	1,500	700	600	(1)	(1)	100	100	(1)	(1)	(1)
Life scientists	80,100	11,500	52,200	3,200	3,000	7,500	700	1,300	300	500
White	71,500	10,300	46,300	2,800	2,700	6,900	600	1,200	200	500
Black	900	(1)	600	(1)	(1)	100	(1)	(1)	(1)	(1)
Asian	4,900	800	3,400	300	200	200	(1)	100	(1)	(1)
Other	2,800	400	1,900	100	100	200	(1)	(1)	(1)	100
Psychologists	38,000	7,100	19,900	5,900	1,700	1,100	200	1,000	700	300
White	35,100	6,500	18,500	5,500	1,600	1,000	200	1,000	600	300
Black	600	100	400	100	(1)	(1)	(1)	(1)	(1)	(1)
Asian	400	100	200	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	1,900	500	800	300	100	100	(1)	(1)	100	(1)
Social scientists	48,600	3,500	36,300	(1)	2,800	3,300	300	1,000	600	800
White	43,400	3,200	32,400	(1)	2,500	3,000	300	900	600	600
Black	1,000	(1)	700	(1)	100	100	(1)	(1)	(1)	(1)
Asian	2,000	100	1,700	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other	2,200	100	1,500	(1)	200	200	(1)	(1)	100	100

[1] Two few cases to estimate.

[2] Includes American Indians and "No Report."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineerings in the United States: 1979 (NSF 80-323).

Appendix table 30.—Experienced[1] scientists and engineers by field, race, and type of employer: 1978

Field and race	Total	Business and industry	Educational institutions	Hospitals and clinics	Nonprofit organizations	Federal government	Military	State government	Other government	Other and No report
All fields	880,600	557,200	127,400	8,400	17,900	89,800	2,800	28,200	30,500	18,400
White	846,000	540,000	121,000	7,900	16,900	85,000	2,800	27,000	27,900	17,700
Black	9,300	3,100	1,900	300	200	2,200	(2)	100	1,100	300
Asian	20,300	11,100	3,600	100	600	2,300	100	900	1,200	300
Other[3]	4,900	3,000	800	(2)	300	300	(2)	200	300	(2)
Physical scientists	100,200	55,400	24,600	900	3,300	10,100	200	1,300	2,600	1700
White	93,900	52,600	23,300	800	2,900	9,100	200	1,300	2,200	1,600
Black	1,700	600	200	100	100	400	(2)	(2)	300	(2)
Asian	3,900	1,800	1,000	(2)	300	700	(2)	(2)	100	(2)
Other	700	500	100	(2)	100	(2)	(2)	(2)	(2)	(2)
Mathematical scientists	22,900	6,600	10,600	(2)	700	3,300	100	600	700	300
White	21,200	6,400	9,900	(2)	600	3,000	100	500	400	300
Black	800	(2)	300	(2)	(2)	200	(2)	(2)	200	(2)
Asian	600	200	400	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Other	200	(2)	100	(2)	(2)	(2)	(2)	100	(2)	(2)
Computer specialists	44,700	33,500	3,500	400	1,100	3,200	200	800	1,300	700
White	43,400	32,700	3,400	400	1,100	2,900	200	800	1,300	700
Black	500	200	(2)	(2)	(2)	200	(2)	(2)	(2)	(2)
Asian	700	500	(2)	(2)	(2)	100	(2)	(2)	(2)	(2)
Other	100	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Environmental scientists	23,500	12,000	4,300	(2)	400	4,400	100	800	1,000	400
White	23,200	11,800	4,200	(2)	400	4,300	100	800	1,000	400
Black	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	200	100	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Other	100	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Engineers	560,800	421,400	25,500	800	8,100	51,100	2,000	17,900	20,700	13,200
White	540,600	408,700	24,000	700	7,800	48,500	1,900	17,000	19,200	12,800
Black	4,000	2,100	300	(2)	(2)	1,100	(2)	(2)	400	200
Asian	13,000	8,300	1,000	100	200	1,300	100	900	1,000	200
Other	3,100	2,300	200	(2)	100	200	(2)	(2)	200	(2)
Life scientists	61,800	14,600	26,800	1,000	1,300	11,700	200	4,100	1,400	800
White	58,900	14,200	25,200	900	1,100	11,200	200	4,000	1,300	800
Black	1,200	(2)	600	100	100	200	(2)	100	(2)	(2)
Asian	1,300	200	700	(2)	100	100	(2)	(2)	(2)	(2)
Other	500	100	300	(2)	(2)	100	(2)	(2)	(2)	(2)
Psychologists	29,100	5,700	14,300	4,600	1,300	800	100	1,100	800	500
White	28,500	5,700	14,000	4,500	1,200	700	100	1,100	700	500
Black	500	(2)	200	100	(2)	100	(2)	(2)	100	(2)
Asian	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Other	100	(2)	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Social scientists	37,500	8,000	17,700	600	1,800	5,200	(2)	1,700	1,900	600
White	36,300	7,800	17,000	600	1,800	5,100	(2)	1,600	1,700	600
Black	600	100	300	(2)	(2)	(2)	(2)	(2)	100	(2)
Asian	500	(2)	400	(2)	(2)	100	(2)	(2)	(2)	(2)
Other	100	(2)	(2)	(2)	(2)	(2)	(2)	100	(2)	(2)

[1] Those scientists and engineers in the labor force at the time of the 1970 Census of Population.

[2] Too few cases to estimate.

[3] Includes American Indians and "Other."

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322).

Appendix table 31.—Experienced[1] and Ph.D. scientists and engineers by field, sex, and full-time/part-time status: 1978 and 1979

Field and sex	Experienced scientists and engineers (1978)			Ph.D. scientists and engineers (1979)		
	Total employed	Full-time	Part-time	Total employed	Full-time	Part-time
All fields	880,600	858,900	21,700	313,700	292,900	10,700
Men	845,800	829,000	16,800	280,400	265,600	6,800
Women	34,800	29,900	4,900	33,300	27,300	3,900
Physical scientists	100,200	97,000	3,300	60,200	56,300	1,600
Men	94,000	91,400	2,600	57,000	53,800	1,300
Women	6,300	5,600	700	3,100	2,500	300
Mathematical scientists	22,900	21,900	1,000	15,300	14,700	400
Men	20,300	19,300	500	14,200	13,700	300
Women	2,500	2,100	500	1,100	1,000	100
Computer specialists	44,700	44,100	600	6,700	6,500	200
Men	39,800	39,600	200	6,400	6,200	200
Women	4,900	4,500	400	400	300	(2)
Environmental scientists	23,500	22,900	600	14,600	13,900	400
Men	22,800	22,200	600	14,000	13,400	400
Women	700	600	(2)	600	500	100
Engineers	560,800	550,700	10,000	50,200	48,900	1,100
Men	558,700	548,800	9,800	49,700	48,400	1,000
Women	2,100	1,900	200	500	500	(2)
Life scientists	61,800	59,800	2,000	80,100	71,500	2,400
Men	56,200	54,900	1,300	68,900	62,900	1,400
Women	5,700	5,000	700	11,100	8,600	1,000
Psychologists	29,100	26,800	2,300	38,000	34,700	2,700
Men	22,500	21,600	900	28,800	27,200	1,200
Women	6,600	5,200	1,400	9,200	7,500	1,500
Social scientists	37,500	35,600	1,900	48,000	46,400	1,800
Men	31,600	30,800	800	41,400	40,000	1,000
Women	6,000	4,900	1,100	7,200	6,300	800

[1] Those scientists and engineers in the labor force at the time of the 1970 Census of Population.

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322) and Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 32.—Experienced[1] and Ph.D. scientists and engineers by field, race, and full-time/part-time status: 1978 and 1979

Field and race	Experienced scientists and engineers (1978) Total employed	Full-time	Part-time	Ph.D. scientists and engineers (1979) Total employed	Full-time	Part-time
All fields	880,600	858,900	21,700	313,700	292,900	10,700
White	846,000	825,100	20,900	276,900	258,400	9,800
Black	9,300	9,100	200	3,400	3,200	200
Asian	20,300	19,800	500	21,000	19,600	300
Other[2]	4,900	4,800	100	12,400	11,600	400
Physical scientists	100,200	97,000	3,300	60,200	56,300	1,600
White	93,900	90,800	3,100	53,100	49,900	1,500
Black	1,700	1,700	(3)	500	500	(3)
Asian	3,900	3,700	200	4,300	3,900	(3)
Other	700	700	(3)	2,200	2,100	100
Mathematical scientists	22,900	21,900	1,000	15,300	14,700	400
White	21,200	20,400	900	13,200	12,700	400
Black	800	700	100	200	200	(3)
Asian	600	600	(3)	900	900	(3)
Other	200	100	(3)	900	900	(3)
Computer specialists	44,700	44,100	600	6,700	6,500	200
White	43,400	42,900	600	6,000	5,700	200
Black	500	500	(3)	(3)	(3)	(3)
Asian	700	700	(3)	500	500	(3)
Other	100	100	(3)	300	300	(3)
Environmental scientists	23,500	22,900	600	14,600	13,900	400
White	23,200	22,600	600	13,600	12,900	400
Black	(3)	(3)	(3)	100	100	(3)
Asian	200	200	100	500	400	(3)
Other	100	100	(3)	500	500	(3)
Engineers	560,800	550,700	10,000	50,200	48,900	1,100
White	540,600	530,700	10,000	41,000	39,800	1,000
Black	4,000	4,000	(3)	200	100	(3)
Asian	13,000	13,000	(3)	7,500	7,400	(3)
Other	3,100	3,100	(3)	1,500	1,500	(3)
Life scientists	61,800	59,800	2,000	80,100	71,500	2,400
White	58,900	57,100	1,800	71,500	63,800	2,200
Black	1,200	1,100	(3)	900	900	(3)
Asian	1,300	1,100	100	4,900	4,200	100
Other	500	500	100	2,800	2,600	100
Psychologists	29,100	26,800	2,300	38,000	34,700	2,700
White	28,500	26,300	2,300	35,100	32,100	2,500
Black	500	500	(3)	600	600	(3)
Asian	(3)	(3)	(3)	400	400	(3)
Other	100	100	(3)	1,900	1,700	100
Social scientists	37,500	35,600	1,900	48,600	46,400	1,800
White	36,300	34,400	1,800	43,400	41,500	1,600
Black	600	600	(3)	1,000	900	100
Asian	500	400	100	2,000	1,900	(3)
Other	100	100	(3)	2,200	2,100	100

[1] Those scientists and engineers in the labor force at the time of the 1970 Census of Population.

[2] Includes: American Indians and "Other" for experienced S/E's; American Indian and "No report" for Ph.D.'s.

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322) and Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 33.—Employed scientists and engineers by field, sex, and age: 1978

Field and sex	Total	24 and under	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70 and over
All fields	2,473,200	195,100	421,300	387,700	347,500	285,300	267,600	248,400	181,800	86,200	34,800	17,500
Men	2,241,700	133,800	361,200	349,000	323,500	270,600	255,300	239,700	175,000	83,600	33,100	16,900
Women	231,500	61,300	60,100	38,700	24,000	14,700	12,300	8,700	6,800	2,600	1,700	600
Physical scientists	212,400	13,500	31,100	24,400	32,800	29,400	26,700	22,400	17,400	10,000	2,800	1,900
Men	197,400	10,100	27,900	22,100	30,600	28,200	25,300	21,700	17,100	9,900	2,600	1,900
Women	15,000	3,400	3,200	2,300	2,200	1,200	1,400	700	300	100	200	(1)
Mathematical scientists	88,400	6,400	11,200	21,500	15,500	11,900	8,300	7,000	3,300	2,300	800	200
Men	70,900	3,900	7,400	18,000	13,000	9,700	7,100	5,700	3,100	2,200	700	100
Women	17,500	2,500	3,800	3,500	2,500	2,200	1,200	1,300	200	100	100	100
Computer specialists	233,900	28,700	59,800	48,000	43,400	22,200	17,500	8,500	4,300	1,400	200	(1)
Men	193,400	16,400	46,000	41,500	39,200	20,800	16,300	7,800	4,000	1,300	100	(1)
Women	40,600	12,300	13,800	6,500	4,200	1,400	1,200	700	300	100	100	(1)
Environmental scientists	72,300	7,800	20,300	6,900	6,100	7,100	8,000	6,500	5,500	2,800	1,100	200
Men	64,600	4,400	17,700	5,900	6,000	7,100	7,900	6,400	5,200	2,700	1,100	200
Women	7,700	3,500	2,600	1,000	100	(1)	100	100	300	(1)	(1)	(1)
Engineers	1,268,400	64,600	193,500	181,900	165,100	152,900	149,800	160,400	112,300	52,700	22,800	12,400
Men	1,248,500	58,400	185,200	178,700	164,200	152,500	149,700	160,000	112,100	52,600	22,800	12,300
Women	19,800	6,200	8,300	3,200	900	400	100	400	200	100	(1)	100
Life scientists	291,000	27,400	61,900	53,600	39,200	30,300	26,800	20,500	18,900	8,800	2,700	700
Men	227,800	13,900	45,900	42,600	32,900	25,700	23,400	18,000	15,200	7,700	1,900	500
Women	63,200	13,500	16,000	11,000	6,300	4,600	3,400	2,500	3,700	1,100	800	200
Psychologists	120,900	22,400	16,300	24,700	18,000	9,900	11,800	8,700	5,700	2,400	800	200
Men	89,700	13,300	12,300	18,100	13,800	8,000	8,900	7,500	5,000	2,000	700	100
Women	31,200	9,000	4,100	6,600	4,200	1,900	2,900	1,200	700	400	100	100
Social scientists	186,000	24,300	27,200	26,700	27,400	21,600	18,700	14,400	14,400	5,800	3,600	1,900
Men	149,500	13,400	18,900	22,100	23,800	18,600	16,700	12,600	13,300	5,100	3,200	1,800
Women	36,500	10,900	8,300	4,600	3,600	3,000	2,000	1,800	1,100	700	400	100

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304).

Appendix table 34.—Employed doctoral scientists and engineers by field, race, and age: 1979

Field and race	Total	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70 and over [1]
All fields	313,700	7,500	52,700	75,900	54,300	39,900	33,100	26,500	15,400	6,500	2,000
White	276,900	6,700	46,000	67,100	46,200	35,100	29,700	24,300	14,000	6,200	1,600
Black	3,400	100	700	900	600	400	300	300	100	(2)	(2)
Asian	21,000	500	4,700	5,000	4,900	2,700	1,700	1,000	400	100	100
Other[3]	12,400	200	1,300	2,900	2,600	1,600	1,500	1,000	800	200	300
Physical scientists	60,200	1,500	9,600	13,700	10,900	7,700	6,500	4,900	3,700	1,400	300
White	53,100	1,400	8,200	12,000	9,100	6,900	6,100	4,400	3,500	1,300	200
Black	500	(2)	100	200	100	100	(2)	(2)	(2)	(2)	(2)
Asian	4,300	100	900	1,100	1,100	500	200	300	(2)	(2)	(2)
Other	2,200	(2)	300	500	500	200	200	200	200	100	(2)
Mathematical scientists	15,300	500	2,400	4,400	2,800	2,000	1,100	900	800	300	100
White	13,200	400	1,900	3,900	2,400	1,600	1,000	800	800	300	100
Black	200	(2)	(2)	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	900	100	300	100	200	200	(2)	(2)	(2)	(2)	(2)
Other	900	(2)	200	300	200	100	100	100	(2)	(2)	(2)
Computer specialists	6,700	300	1,900	2,200	1,000	500	300	300	100	(2)	(2)
White	6,000	200	1,600	2,100	900	500	300	200	100	(2)	(2)
Black	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	500	100	200	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Other	300	(2)	(2)	100	100	(2)	(2)	100	(2)	(2)	(2)
Environmental scientists	14,600	200	2,300	3,500	2,700	2,300	1,200	1,300	500	400	100
White	13,600	200	2,100	3,200	2,500	2,200	1,100	1,300	500	300	100
Black	100	(2)	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	500	(2)	100	100	100	(2)	(2)	(2)	(2)	(2)	(2)
Other	500	(2)	(2)	100	100	100	100	(2)	(2)	(2)	(2)
Engineers	50,200	1,000	7,300	12,300	10,900	6,800	5,400	4,200	1,600	700	200
White	41,000	700	5,100	10,100	8,700	5,700	4,600	3,900	1,300	600	100
Black	200	(2)	100	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Asian	7,500	200	1,900	1,800	1,900	700	600	200	200	(2)	100
Other	1,500	100	100	300	300	400	200	100	100	(2)	(2)
Life scientists	80,100	1,700	14,700	18,500	12,900	9,800	9,100	6,900	4,300	1,700	500
White	71,500	1,500	13,400	16,300	11,100	8,600	8,200	6,400	4,000	1,600	400
Black	900	(2)	100	200	100	100	100	100	(2)	(2)	(2)
Asian	4,900	100	900	1,200	1,100	600	500	300	100	(2)	(2)
Other	2,800	100	400	800	500	400	300	200	200	(2)	(2)
Psychologists	38,000	1,500	7,700	8,400	5,200	4,700	4,200	3,300	1,700	700	500
White	35,100	1,500	7,300	7,900	4,800	4,300	3,900	3,100	1,500	700	300
Black	600	(2)	200	100	100	100	(2)	100	(2)	(2)	(2)
Asian	400	(2)	100	100	100	(2)	100	(2)	(2)	(2)	(2)
Other	1,900	(2)	100	300	300	300	300	200	200	(2)	100
Social scientists	48,600	800	6,700	12,900	7,900	6,100	5,200	4,500	2,700	1,400	400
White	43,400	800	6,300	11,600	6,600	5,400	4,600	4,200	2,400	1,300	400
Black	1,000	(2)	200	300	300	100	100	(2)	100	(2)	(2)
Asian	2,000	(2)	200	400	400	500	300	200	(2)	(2)	(2)
Other	2,200	(2)	100	600	600	100	300	100	200	(2)	100

[1] Includes "No report."

[2] Too few cases to estimate.

[3] Includes American Indians and "No report."

Note: Detail may not add to totals because of rounding.
Source: National Science Foundation, unpublished data.

Appendix table 35.—Doctoral scientists and engineers by field, sex, and age: 1979

Field and sex	Total	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70 and over [1]
All fields	332,300	7,900	54,700	77,400	55,100	40,700	33,900	27,500	17,800	11,000	6,300
Men	294,400	6,300	45,400	69,200	50,000	37,100	30,400	25,000	16,100	9,800	5,000
Women	37,900	1,600	9,300	8,200	5,100	3,600	3,500	2,500	1,700	1,100	1,300
Physical scientists	64,300	1,600	9,800	14,000	11,000	7,900	6,700	5,100	4,500	2,500	1,100
Men	60,600	1,400	9,000	13,200	10,400	7,600	6,400	4,900	4,300	2,400	900
Women	3,700	200	800	800	600	300	400	200	200	100	100
Mathematical scientists	16,100	500	2,500	4,500	2,800	2,000	1,100	1,000	900	500	300
Men	14,800	400	2,200	4,200	2,600	1,900	1,000	900	800	500	300
Women	1,300	100	300	300	200	100	100	100	100	(2)	(2)
Computer specialists	6,800	300	1,900	2,300	1,000	500	300	300	100	(2)	(2)
Men	6,400	200	1,700	2,200	1,000	500	300	300	100	(2)	(2)
Women	400	(2)	200	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Environmental specialists	15,100	200	2,400	3,500	2,800	2,400	1,200	1,300	600	500	200
Men	14,400	200	2,200	3,400	2,700	2,300	1,200	1,300	500	400	200
Women	700	(2)	200	100	100	100	(2)	(2)	(2)	(2)	(2)
Engineers	51,500	1,000	7,500	12,400	11,000	6,800	5,400	4,300	1,800	1,000	300
Men	51,000	1,000	7,300	12,200	10,900	6,800	5,400	4,300	1,700	1,000	300
Women	600	(2)	200	100	100	(2)	(2)	(2)	(2)	(2)	(2)
Life scientists	86,300	1,900	15,400	19,100	13,200	10,000	9,400	7,200	5,000	3,200	2,000
Men	73,200	1,400	12,200	16,200	11,500	8,900	8,100	6,400	4,300	2,800	1,500
Women	13,100	500	3,300	2,900	1,700	1,100	1,300	800	700	400	400
Psychologists	40,300	1,600	8,200	8,500	5,400	4,800	4,300	3,500	2,000	1,100	900
Men	30,100	1,000	5,600	6,600	4,000	3,700	3,500	2,700	1,600	700	500
Women	10,200	600	2,600	1,900	1,300	1,100	800	800	400	300	300
Social scientists	52,000	800	6,900	13,200	8,000	6,300	5,400	4,700	3,000	2,100	1,400
Men	43,800	600	5,100	11,200	6,900	5,500	4,700	4,100	2,700	1,800	1,100
Women	8,100	200	1,800	2,000	1,100	800	800	600	300	300	300

[1] Includes "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 36.—Characteristics of Ph.D. scientists and engineers by Hispanic origin: 1979

Field		Sex, race, and age		Employment status and years professional experience		Type of employer, primary work activity	
All fields	2,600	Men	2,200	Labor force	2,500	Business/industry	500
		Women	400			Educational institutions	1,400
Physical scientists	500			Total employed	2,500	Hospital and clinics	100
Chemists	300	White	1,500	In S/E	2,100	Nonprofit organizations	200
Physicists/Astronomers	100	Black	(1)	Outside S/E	200	Federal government	200
		Asian	100	Postdoctorates	200	Military	(1)
Mathematical scientists	100	Other	1,000			State government	(1)
Mathematicians	100			Unemployed, seeking	(1)	Other government	(1)
Statisticians	(1)	Total	2,600			Other and no report	100
		25-29	100	Outside labor force	(1)		
Computer specialists	(1)	30-34	700			Research/development	900
		35-39	700	Total		Basic research	500
Environmental scientists	100	40-44	400	1 year and less	100	Applied research	300
Earth scientists	(1)	45-49	300	2-4 years	400	Development	100
Oceanographers	(1)	50-54	200	5-9 years	800	Management of R&D	300
Atmospheric scientists	(1)	55-59	100	10-14 years	400	Management	200
		60-64	100	15-19 years	400	Teaching	800
Engineers	300	65-69	(1)	20-24 years	100	Consulting	(1)
		70 and over	(1)	25-29 years	200	Sales	200
Life scientists	800	No report	(1)	30-34 years	100	Other and no report	100
Biological scientists	500			35-39 years	(1)		
Agricultural scientists	100			40 or more years	100		
Medical scientists	200			No report	100		
Psychologists	400						
Social scientists	400						
Economists	100						
Sociologists/ Anthropologists	100						
Other social scientists	200						

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, unpublished data.

Appendix table 37.—Scientists and engineers--labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and sex: 1978

	Labor force participation rates		Science and engineering utilization rates		Unemployment rates	
Field	Men	Women	Men	Women	Men	Women
All fields	92	89	86.2	56.7	1.3	2.4
Physical scientists	87	70	86.9	64.4	1.7	6.3
Mathematical scientists	82	91	53.1	26.4	1.3	2.8
Computer specialists	99.5	95	98.5	99.2	0.3	0.2
Environmental scientists	92	91	86.8	63.9	2.4	1.3
Engineers	92	94	93.6	86.7	1.3	3.4
Life scientists	91	89	71.5	56.3	1.6	1.9
Psychologists	95	89	63.9	40.7	1.5	2.8
Social scientists	93	90	59.1	18.9	0.7	3.7

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304) and unpublished data.

Appendix table 38.—Scientists and engineers by labor force participation rates, science and engineering utilization rates,[1] and unemployment rates; by field and race: 1978

	Labor force participation rates			Science and engineering utilization rates			Unemployment rates		
Field	White	Black	Asian	White	Black	Asian	White	Black	Asian
All fields	91.3	94.7	95.5	94.6	93.2	97.5	1.4	1.5	1.6
Physical scientists	85.0	86.5	93.0	96.9	91.1	98.9	2.0	3.1	(2)
Mathematical scientists	82.8	96.7	90.0	93.2	90.9	97.3	1.5	(2)	(2)
Computer specialists	98.8	92.9	100.0	97.6	100.0	100.0	0.2	15.4	(2)
Environmental scientists	91.5	100.0	100.0	97.2	(2)	69.8	2.2	(2)	(2)
Engineers	91.8	93.0	97.8	94.6	98.2	97.5	1.3	(2)	(2)
Life scientists	90.2	98.5	88.1	94.6	96.3	99.0	1.5	(2)	11.5
Psychologists	93.7	94.6	0	92.9	87.8	(2)	1.7	5.7	(2)
Social scientists	91.4	97.3	94.4	86.5	63.3	93.0	1.4	0.9	(2)

[1] Science and engineering utilization rates are computed for experienced scientists and engineers (those scientists and engineers in the labor force at the time of the 1970 Census).

[2] Too few cases to estimate.

Source: National Science Foundation, U.S. Scientists and Engineers: 1978 (NSF 80-304) and Characteristics of Experienced Scientists and Engineers: 1978 (NSF 79-322).

Appendix table 39.—Doctoral scientists and engineers--labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and sex: 1979

	Labor force participation rates		Science and engineering utilization rates		Unemployment rates	
Field	Men	Women	Men	Women	Men	Women
All fields	95.9	90.4	91.2	87.3	0.7	2.7
Physical scientists	95.1	87.7	89.6	85.6	1.0	3.5
Mathematical scientists	96.2	89.9	92.0	90.5	0.3	2.2
Computer specialists	99.8	98.4	98.2	98.9	(1)	(1)
Environmental scientists	97.4	93.6	96.1	96.6	0.3	1.8
Engineers	96.2	96.2	93.4	92.5	0.5	1.7
Life scientists	94.8	87.9	94.4	91.2	0.8	3.1
Psychologists	96.4	92.4	91.8	89.4	0.9	1.8
Social scientists	95.1	92.2	81.7	77.2	0.7	3.3

[1] Too few cases to estimate.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States 1979 (NSF 80-323).

Appendix table 40.—Doctoral scientists and engineers--labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and race: 1979

	Labor force participation rates			Science and engineering utilization rates			Unemployment rates		
Field	White	Black	Asian	White	Black	Asian	White	Black	Asian
All fields	95.2	94.9	98.0	90.7	85.6	93.1	0.9	2.8	1.1
Physical scientists	94.3	93.6	98.8	89.4	87.6	92.2	1.0	5.9	1.7
Mathematical scientists	95.4	100.0	99.1	92.0	98.7	90.3	0.5	(1)	0.4
Computer specialists	99.9	(1)	97.2	98.2	(1)	98.0	(1)	(1)	(1)
Environmental scientists	97.1	100.0	99.8	96.2	100.0	97.3	0.3	(1)	0.2
Engineers	97.9	100.0	98.4	93.3	91.3	94.1	0.5	(1)	0.8
Life scientists	93.8	91.6	96.9	94.0	92.8	96.2	1.0	1.7	1.3
Psychologists	95.5	97.9	91.8	91.6	81.2	84.0	1.2	1.2	0.7
Social scientists	94.5	95.1	98.2	8.7	76.6	84.6	0.9	4.2	1.1

[1] Too few cases to estimate.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 41.—Doctoral women scientists and engineers by labor force participation rates, science and engineering utilization rates, and unemployment rates; by field and race: 1979

	Labor force participation rates			Science and engineering utilization rates			Unemployment rates		
Field	White	Black	Asian	White	Black	Asian	White	Black	Asian
All fields	90.1	94.0	94.1	87.3	83.2	89.6	2.7	2.0	4.0
Physical scientists	86.5	100.0	93.7	86.0	80.0	85.0	3.0	(1)	7.0
Mathematical scientists	89.5	100.0	94.5	90.0	100.0	93.3	2.2	(1)	3.8
Computer specialists	97.9	100.0	100.0	99.0	100.0	100.0	(1)	(1)	(1)
Environmental scientists	93.4	100.0	97.3	96.0	100.0	100.0	1.8	(1)	2.8
Engineers	97.2	100.0	95.0	91.0	100.0	96.0	1.9	(1)	1.0
Life scientists	87.6	91.9	92.8	91.0	90.0	95.0	3.0	3.3	3.2
Psychologists	92.3	94.7	93.8	90.0	81.0	73.7	1.9	0.9	2.0
Social scientists	92.0	94.1	99.1	77.0	76.0	83.0	3.4	2.2	4.6

[1] Too few cases to estimate.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NSF 80-323).

Appendix table 42.—Experienced[1] scientists and engineers by field, sex, race, and median annual salary: 1978

Field	Total	Men	Women	White	Black	Asian	Other[2]
All fields	$27,200	$27,400	$22,600	$27,300	$24,900	$25,800	$24,300
Physical scientists	27,600	28,000	22,000	27,800	23,400	26,300	(3)
Chemists	26,700	27,300	21,200	27,000	23,300	25,300	(3)
Physicists/Astronomers	29,300	29,300	30,700	29,400	(3)	28,300	(3)
Other physical scientists	28,900	29,100	(3)	29,300	(3)	(3)	(3)
Mathematical scientists	27,500	27,900	24,100	27,700	26,600	26,800	(3)
Mathematicians	27,500	28,000	22,500	27,700	26,400	(3)	(3)
Statisticians	27,500	27,600	26,700	27,600	(3)	(3)	(3)
Computer specialists	25,900	26,200	23,600	25,900	25,600	25,100	(3)
Environmental scientists	30,400	30,500	24,700	30,400	(3)	(3)	(3)
Earth scientists	30,600	30,800	24,700	30,600	(3)	(3)	(3)
Oceanographers	26,800	26,800	(3)	26,700	(3)	(3)	(3)
Atmospheric scientists	29,700	29,700	(3)	29,500	(3)	(3)	(3)
Engineers	27,400	27,400	24,100	27,500	28,800	25,600	24,700
Life scientists	24,900	25,200	21,900	25,000	22,200	22,800	21,700
Biological scientists	25,200	25,800	21,800	25,300	22,600	27,000	(3)
Agricultural scientists	23,800	23,900	(3)	23,800	(3)	(3)	(3)
Medical scientists	28,900	30,200	22,800	30,000	(3)	(3)	(3)
Psychologists	26,500	27,300	23,800	26,500	28,500	(3)	(3)
Social scientists	27,600	28,700	21,000	27,700	22,000	(3)	(3)
Economists	30,500	30,800	25,600	30,500	(3)	(3)	(3)
Sociologists/ Anthropologists	25,900	26,900	21,500	26,000	(3)	(3)	(3)
Other social scientists	26,400	27,400	19,800	26,500	(3)	(3)	(3)

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

[2] Includes American Indians and "No report."

[3] Too few cases to estimate.

Source: National Science Foundation, Characteristics of Experienced Scientists and Engineers (NSF 79-322).

Appendix table 43.—Doctoral scientists and engineers by field, sex, race, and median annual salary: 1979

Field	Total	Men	Women	White	Black	Asian	Other [1]
All fields	$29,100	$29,900	$23,100	$29,200	$26,600	$28,200	$29,800
Physical scientists	30,300	30,500	24,400	30,400	28,000	27,800	30,600
Chemists	30,400	30,700	24,200	30,600	25,500	28,200	29,300
Physicists/Astronomers	30,100	30,200	25,400	30,100	(2)	27,500	32,100
Mathematical scientists	26,300	26,700	21,700	26,400	25,100	25,700	28,300
Mathematicians	26,100	26,400	21,800	26,000	22,900	28,400	26,900
Statisticians	29,300	29,600	21,600	29,600	(2)	(2)	(2)
Computer specialists	28,500	28,800	22,800	28,400	(2)	29,800	(2)
Environmental scientists	30,300	30,400	23,500	30,300	(2)	25,800	34,700
Earth scientists	30,300	30,400	25,300	30,300	(2)	27,900	36,500
Oceanographers	28,800	30,100	21,500	28,800	(2)	(2)	(2)
Atmospheric scientists	31,300	31,800	(2)	31,600	(2)	(2)	(2)
Engineers	33,100	33,200	26,600	33,900	(2)	30,300	32,500
Life scientists	28,100	28,900	23,000	28,400	25,000	26,000	28,300
Biological scientists	26,500	27,500	22,200	26,700	25,600	24,800	27,100
Agricultural scientists	29,000	29,100	21,600	29,200	(2)	26,000	31,700
Medical scientists	30,900	32,700	25,300	31,200	26,500	28,900	30,700
Psychologists	26,700	28,000	23,200	26,600	24,800	25,400	30,100
Social scientists	26,200	26,800	22,600	26,100	28,000	25,200	28,600
Economists	31,000	31,500	26,900	30,900	(2)	35,300	(2)
Sociologists/ Anthropologists	23,900	25,000	22,100	23,800	23,900	24,300	29,100
Other social scientists	25,300	25,700	22,300	25,300	28,900	23,400	25,700

[1] Includes American Indians and "No report."

[2] Too few cases to estimate.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States: 1979 (NF 80-323).

Appendix table 44.—Percent distribution of experienced[1] and Ph.D. scientists and engineers by field, sex, and reason for non-S/E employment: 1978 and 1979

Field	Total scientists and engineers in non-S/E		Prefer non-S/E		Promoted out		Better pay		Locational preference		Believe S/E job not available		Other[2]	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
							Experienced S/E's (1978)							
All fields	100.0	100.0	14.5	17.1	35.0	8.1	7.7	18.6	6.7	13.2	7.4	13.2	28.8	29.8
Physical scientists	100.0	100.0	7.2	9.6	43.1	32.7	3.8	9.3	9.3	(3)	7.1	39.9	29.5	8.5
Mathematical scientists	100.0	100.0	8.2	(3)	29.0	(3)	10.6	100.0	9.5	(3)	6.4	(3)	36.2	(3)
Computer specialists	100.0	100.0	48.0	(3)	10.0	(3)	22.1	85.2	3.4	(3)	3.0	(3)	13.5	14.8
Environmental scientists	100.0	100.0	24.7	(3)	8.9	(3)	24.1	(3)	(3)	(3)	3.7	100.0	38.6	(3)
Engineers	100.0	100.0	12.7	40.7	37.7	14.1	6.5	(3)	6.0	8.4	8.8	(3)	28.2	36.9
Life scientists	100.0	100.0	1.1	9.5	45.2	(3)	16.5	7.7	8.6	64.5	3.9	(3)	24.7	18.3
Psychologists	100.0	100.0	30.4	24.5	20.5	5.7	5.4	(3)	13.0	17.9	8.0	6.1	22.7	45.9
Social scientists	100.0	100.0	30.4	12.3	19.6	(3)	6.7	29.6	6.4	10.9	1.2	8.3	35.6	38.9
							Ph.D. S/E's (1979)							
All fields	100.0	100.0	20.8	19.0	22.8	14.1	6.4	4.5	0.9	2.6	7.6	22.5	41.5	37.4
Physical scientists	100.0	100.0	25.9	23.3	34.8	20.6	3.6	1.1	0.7	7.9	10.0	21.2	25.0	25.9
Mathematical scientists	100.0	100.0	26.1	25.9	17.6	16.7	9.5	5.6	(3)	7.4	13.0	11.1	33.8	33.3
Computer specialists	100.0	100.0	27.3	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	72.7	100.0
Environmental scientists	100.0	100.0	29.2	(3)	36.8	33.3	(3)	33.3	4.9	(3)	2.8	(3)	26.4	33.3
Engineers	100.0	100.0	18.6	(3)	33.8	50.0	10.3	(3)	0.7	(3)	4.8	(3)	31.7	50.0
Life scientists	100.0	100.0	13.7	14.6	36.3	24.8	9.6	(3)	0.8	1.7	12.0	29.8	27.7	29.1
Psychologists	100.0	100.0	17.0	15.7	18.2	8.6	4.1	3.7	(3)	3.2	6.8	27.3	53.9	41.4
Social scientists	100.0	100.0	21.0	20.9	9.4	11.4	5.9	6.6	1.2	1.4	6.0	19.7	56.5	40.0

---

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

[2] Includes "No report."

[3] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 45.—Percent distribution of experienced[1] and Ph.D. scientists and engineers by field, race, and reason for non-S/E employment: 1978 and 1979

	Total scientists and engineers in non-S/E		Prefer non-S/E		Promoted out		Better pay		Locational preference		Believe S/E job not available		Other[2]	
Field and race	Experienced	Ph.D.	Experienced	Ph.D.	Experienced	Ph.D.	Experienced	Ph.D.	Experienced	Ph.D.	Experienced	Ph.D.	Experienced	Ph.D.
All fields	100.0	100.0	14.7	20.5	33.6	21.8	8.2	6.1	7.0	1.1	7.7	9.4	28.9	41.0
White	100.0	100.0	14.7	20.0	34.1	22.7	8.1	6.1	6.7	1.0	7.5	9.4	28.8	40.8
Black	100.0	100.0	7.6	18.7	30.4	29.6	18.9	3.9	14.8	2.8	5.0	5.9	23.3	39.1
Asian	100.0	100.0	19.0	21.2	2.7	0.3	(3)	8.6	12.3	1.1	22.8	12.3	43.2	56.5
Other[4]	100.0	100.0	(3)	39.6	60.4	14.1	(3)	5.9	39.6	4.1	(3)	9.1	(3)	27.2
Physical scientists	100.0	100.0	7.5	25.7	41.8	33.9	4.5	3.4	8.2	1.2	11.3	10.7	26.8	25.0
White	100.0	100.0	8.1	25.7	38.6	36.5	4.9	3.6	8.8	0.9	12.1	8.6	27.6	24.8
Black	100.0	100.0	(3)	33.3	100.0	(3)	(3)	33.3	(3)	(3)	(3)	(3)	(3)	33.3
Asian	100.0	100.0	(3)	1.5	(3)	1.5	(3)	(3)	(3)	3.7	(3)	48.5	100.0	44.9
Other	100.0	100.0	(3)	63.4	(3)	3.2	(3)	(3)	(3)	6.5	(3)	23.7	(3)	3.2
Mathematical scientists	100.0	100.0	8.1	26.1	28.7	17.6	11.6	9.2	9.4	0.6	6.3	12.8	35.8	33.7
White	100.0	100.0	8.6	26.4	30.5	18.9	12.3	10.0	3.9	0.7	6.7	14.0	38.0	29.9
Black	100.0	100.0	(3)	(3)	(3)	100.0	(3)	(3)	100.0	(3)	(3)	(3)	(3)	(3)
Asian	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100.0
Other	100.0	100.0	(3)	25.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	75.0
Computer specialists	100.0	100.0	38.2	26.1	8.0	(3)	35.0	(3)	2.7	(3)	2.4	(3)	13.7	73.9
White	100.0	100.0	38.2	27.3	8.0	(3)	35.0	(3)	2.7	(3)	2.4	(3)	13.7	72.7
Black	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Other	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100.0
Environmental scientists	100.0	100.0	21.4	28.6	7.7	36.7	20.9	0.7	(3)	4.8	16.4	2.7	33.5	26.5
White	100.0	100.0	24.7	26.8	8.9	36.2	24.1	0.7	(3)	5.1	3.7	2.9	38.6	28.3
Black	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Asian	100.0	100.0	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	100.0	(3)	(3)	(3)
Other	100.0	100.0	(3)	55.6	(3)	44.4	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Engineers	100.0	100.0	13.2	18.5	37.4	33.9	6.4	10.2	6.1	0.7	8.6	4.8	28.4	31.8
White	100.0	100.0	13.1	18.0	38.1	37.4	6.6	9.0	5.8	0.8	8.6	5.4	27.9	29.4
Black	100.0	100.0	13.0	(3)	11.6	100.0	(3)	(3)	(3)	(3)	11.6	(3)	63.8	(3)
Asian	100.0	100.0	20.9	19.4	3.4	(3)	(3)	3.0	15.5	(3)	12.0	(3)	48.2	57.6
Other	100.0	100.0	(3)	100.0	50.0	(3)	(3)	(3)	50.0	(3)	(3)	(3)	(3)	(3)
Life scientists	100.0	100.0	1.6	13.8	42.1	34.7	15.9	8.2	12.5	0.9	3.7	14.6	24.3	27.9
White	100.0	100.0	1.1	14.0	34.5	34.3	16.2	7.3	12.7	0.8	3.2	15.6	24.0	28.0
Black	100.0	100.0	(3)	25.0	(3)	42.9	(3)	(3)	(3)	3.6	46.7	7.1	53.3	21.4
Asian	100.0	100.0	100.0	10.5	(3)	(3)	(3)	31.6	(3)	10.5	(3)	47.4	(3)	(3)
Other	100.0	100.0	(3)	7.7	(3)	44.4	(3)	22.2	(3)	(3)	(3)	1.7	(3)	23.9
Psychologists	100.0	100.0	29.5	16.7	18.2	15.8	4.6	4.0	13.8	0.8	7.7	11.8	26.3	50.8
White	100.0	100.0	29.0	14.2	18.5	17.2	4.7	4.0	13.0	0.3	7.9	11.9	26.9	52.5
Black	100.0	100.0	50.0	33.3	(3)	5.3	(3)	10.5	50.0	3.5	(3)	12.3	(3)	35.1
Asian	100.0	100.0	(3)	35.7	(3)	(3)	(3)	(3)	(3)	(3)	(3)	28.6	(3)	35.7
Other	100.0	100.0	(3)	49.4	(3)	(3)	(3)	1.2	(3)	8.2	(3)	3.5	(3)	32.9
Social scientists	100.0	100.0	27.4	21.0	16.4	9.7	10.5	6.0	7.2	1.2	2.4	8.1	36.2	53.9
White	100.0	100.0	25.4	20.3	14.1	9.7	7.2	6.5	6.7	1.2	2.2	8.4	33.0	54.0
Black	100.0	100.0	6.6	14.3	17.3	29.1	57.9	1.7	(3)	2.9	(3)	4.0	18.3	47.4
Asian	100.0	100.0	(3)	33.3	(3)	(3)	(3)	(3)	(3)	(3)	(3)	3.8	(3)	62.8
Other	100.0	100.0	(3)	45.7	100.0	2.5	(3)	(3)	(3)	7.4	(3)	13.6	(3)	30.9

---

[1] Those scientists and engineers in the labor force at the time of the 1970 Census.

[2] Includes "No report."

[3] Too few cases to estimate.

[4] Includes American Indians and "No report."

Source: National Science Foundation, unpublished data.

Appendix table 46.—Recent science and engineering bachelor's degree recipients by field, sex, and labor force status: 1978 and 1979 in 1980

Field and sex	Total [1]	Labor force [2]	Total employed	Employed in S/E	Employed in non-S/E	Unemployed, seeking	Employed in field	Full-time graduate students
All fields	598,600	445,100	429,100	226,600	202,500	16,000	187,100	138,400
Men	394,600	294,300	284,800	171,100	113,700	9,500	144,300	95,200
Women	204,000	150,800	144,300	55,500	88,800	6,500	42,800	43,100
Physical scientists	33,900	18,500	18,100	14,000	4,100	400	8,400	14,600
Men	26,000	13,700	13,300	10,400	2,900	400	6,300	12,000
Women	7,900	4,800	4,800	3,500	1,200	100	2,100	2,700
Mathematical scientists	24,600	19,500	18,900	11,700	7,200	600	9,400	4,500
Men	14,400	10,600	10,200	6,400	3,800	400	5,500	3,700
Women	10,200	8,900	8,700	5,300	3,400	200	3,800	800
Computer specialists	16,000	15,100	14,800	13,800	900	300	13,400	900
Men	11,700	10,800	10,600	9,800	800	200	9,500	800
Women	4,300	4,300	4,200	4,000	100	100	3,900	(3)
Environmental scientists	20,000	14,900	14,100	8,300	5,800	800	5,200	4,500
Men	15,000	11,300	10,800	6,500	4,300	500	4,100	3,600
Women	4,900	3,600	3,300	1,800	1,500	300	1,200	900
Engineers	119,200	108,600	107,200	99,300	7,800	1,500	94,300	9,800
Men	110,500	100,500	99,100	91,900	7,200	1,400	87,400	9,200
Women	8,700	8,100	8,000	7,400	600	100	6,800	600
Life scientists	152,700	97,500	92,400	48,600	43,800	5,100	36,200	51,200
Men	97,900	60,400	58,000	30,400	27,500	2,400	22,900	35,900
Women	54,800	37,100	34,400	18,200	16,300	2,600	13,300	15,300
Psychologists	88,100	65,300	63,200	11,500	51,800	2,100	9,000	19,300
Men	35,200	26,200	25,200	4,800	20,400	900	3,500	8,800
Women	52,900	39,200	38,000	6,700	31,400	1,200	5,600	10,500
Social scientists	144,200	105,700	100,500	19,500	81,000	5,200	11,300	33,600
Men	84,000	60,900	57,600	10,800	45,800	3,300	5,100	21,400
Women	60,300	44,900	42,900	8,700	34,200	1,900	6,200	12,300

[1] Includes full-time graduate students.

[2] Excludes full-time graduate students.

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.
Source: National Science Foundation, unpublished data.

Appendix table 47.—Recent science and engineering master's degree recipients by field, sex, and labor force status: 1978 and 1979 in 1980

Field and sex	Total [1]	Labor force [2]	Total employed	Employed in S/E	Employed in non-S/E	Unemployed, seeking	Employed in field	Full-time graduate students
All fields	110,100	83,500	81,600	66,700	15,000	1,900	59,300	24,100
Men	82,700	63,500	62,700	53,200	9,500	800	47,100	18,400
Women	27,400	20,000	18,900	13,500	5,400	1,100	12,200	5,700
Physical scientists	7,100	4,300	4,200	3,600	600	100	2,600	2,700
Men	6,000	3,400	3,300	3,000	400	100	2,100	2,500
Women	1,100	900	800	600	200	(3)	500	300
Mathematical scientists	6,400	5,200	5,000	3,700	1,300	200	3,100	1,100
Men	4,200	3,300	3,100	2,300	800	100	1,900	1,000
Women	2,200	1,900	1,900	1,300	500	(3)	1,200	100
Computer specialists	6,100	5,500	5,500	5,100	400	(3)	4,500	400
Men	4,900	4,400	4,400	4,100	300	(3)	3,600	400
Women	1,200	1,100	1,100	1,000	100	(3)	1,000	(3)
Environmental scientists	5,200	4,100	4,000	3,500	500	100	3,100	1,000
Men	4,100	3,200	3,100	2,800	300	100	2,500	900
Women	1,100	900	900	700	200	(3)	500	100
Engineers	33,200	28,300	28,100	26,700	1,400	200	24,400	4,600
Men	31,100	26,700	26,600	25,300	1,300	100	23,300	4,200
Women	2,100	1,600	1,500	1,400	100	100	1,200	400
Life scientists	21,800	15,200	14,800	11,700	3,100	400	10,600	6,300
Men	15,000	10,400	10,300	8,100	2,200	100	7,300	4,600
Women	6,700	4,700	4,500	3,600	900	200	3,300	1,700
Psychologists	16,200	10,800	10,400	7,200	3,200	400	6,700	4,300
Men	7,600	5,100	5,100	3,600	1,500	(3)	3,400	2,200
Women	8,600	5,700	5,300	3,500	1,800	400	3,300	2,100
Social scientists	14,100	10,200	9,600	5,200	4,400	600	4,200	3,600
Men	9,800	6,900	6,600	3,900	2,800	300	3,000	2,700
Women	4,300	3,200	3,000	1,300	1,600	300	1,200	800

[1] Includes full-time graduate students.

[2] Excludes full-time graduate students.

[3] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, unpublished data.

Appendix table 48.—Recent science and engineering bachelor's degree recipients by field, race, and labor force status: 1978 and 1979 in 1980

Field and race	Total[1]	Labor force[2]	Total employed	Employed in S/E	Employed in non-S/E	Unemployed, seeking	Employed in field	Full-time graduate students
All fields	598,600	445,100	429,100	226,600	202,500	16,000	187,100	138,400
White	552,800	412,200	398,700	211,700	187,000	13,500	174,200	126,700
Black	25,400	19,500	17,700	7,700	10,000	1,800	6,500	5,100
Other minorities[3]	12,600	8,600	8,200	5,000	3,200	400	4,400	3,800
Physical scientists	33,900	18,500	18,100	14,000	4,100	400	8,400	14,600
White	31,800	17,700	17,300	13,300	4,000	400	8,100	13,400
Black	900	400	400	300	100	(4)	100	500
Other minorities	700	100	100	100	(4)	(4)	100	600
Mathematical scientists	24,600	19,500	18,900	11,700	7,200	600	9,400	4,500
White	22,900	18,400	17,800	10,800	7,100	600	8,900	4,100
Black	1,100	700	700	600	100	(4)	200	300
Other minorities	400	300	300	300	(4)	(4)	300	100
Computer specialists	16,000	15,100	14,800	13,800	900	300	13,400	900
White	13,700	12,800	12,700	12,100	700	(4)	11,700	900
Black	1,600	1,600	1,400	1,100	300	300	1,100	(4)
Other minorities	500	500	500	500	(4)	(4)	500	(4)
Environmental scientists	20,000	14,900	14,100	8,300	5,800	800	5,200	4,500
White	19,500	14,500	13,700	8,100	5,600	800	5,100	4,400
Black	200	200	200	100	100	(4)	(4)	(4)
Other minorities	200	200	100	100	(4)	(4)	100	(4)
Engineers	119,200	108,600	107,200	99,300	7,800	1,500	94,300	9,800
White	110,800	101,500	100,200	93,100	7,100	1,300	88,100	8,600
Black	3,400	3,000	2,900	2,600	300	100	2,500	400
Other minorities	3,100	2,700	2,600	2,600	100	100	2,500	400
Life scientists	152,700	97,500	92,400	48,600	43,800	5,100	36,200	51,200
White	142,100	91,300	86,600	45,600	41,000	4,600	34,200	47,300
Black	3,900	2,200	2,200	1,200	1,000	100	700	1,500
Other minorities	4,500	2,900	2,600	1,300	1,200	300	800	1,400
Psychologists	88,100	65,300	63,200	11,500	51,800	2,100	9,000	19,300
White	81,100	59,900	58,300	10,800	47,400	1,700	8,400	17,900
Black	4,800	4,100	3,700	500	3,200	400	500	700
Other minorities	1,100	800	800	100	700	(4)	100	300
Social scientists	144,200	105,700	100,500	19,500	81,000	5,200	11,300	33,600
White	130,800	96,200	92,000	17,900	74,100	4,100	9,700	30,200
Black	9,500	7,400	6,400	1,400	5,000	1,000	1,400	1,700
Other minorities	2,200	1,200	1,200	(4)	1,200	(4)	(4)	1,000

---

[1] Includes full-time graduate students.

[2] Excludes full-time graduate students.

[3] Overall, 84 percent of "Other minorities" are classified as Asians.

[4] Too few cases to estimate.

Note: Detail does not add to totals because of rounding and because "No report" is excluded.

Source: National Science Foundation, unpublished data.

Appendix table 49.—Recent science and engineering master's degree recipients by field, race, and labor force status: 1978 and 1979 in 1980

Field and race	Total[1]	Labor force[2]	Total employed	Employed in S/E	Employed in non-S/E	Unemployed, seeking	Employed in field	Full-time graduate students
All fields	110,100	83,500	81,600	66,700	15,000	1,900	59,300	24,100
White	98,900	75,900	74,400	60,300	14,000	1,600	53,900	20,800
Black	2,900	2,000	1,800	1,300	500	300	1,000	700
Other minorities[3]	6,800	4,600	4,600	4,300	300	(4)	3,800	2,100
Physical scientists	7,100	4,300	4,200	3,600	600	100	2,600	2,700
White	5,900	3,700	3,700	3,000	600	100	2,300	2,100
Black	300	200	200	200	(4)	(4)	200	100
Other minorities	700	200	200	200	(4)	(4)	100	500
Mathematical scientists	6,400	5,200	5,000	3,700	1,300	200	3,100	1,100
White	6,100	4,900	4,800	3,500	1,300	200	2,900	1,000
Black	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Other minorities	300	200	200	100	(4)	(4)	100	100
Computer specialists	6,100	5,500	5,500	5,100	400	(4)	4,500	400
White	5,400	4,900	4,900	4,500	400	(4)	4,000	300
Black	100	100	100	100	(4)	(4)	(4)	(4)
Other minorities	600	500	500	500	(4)	(4)	500	200
Environmental scientists	5,200	4,100	4,000	3,500	500	100	3,100	1,000
White	5,000	3,900	3,900	3,400	500	100	2,900	700
Black	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Other minorities	100	100	100	100	(4)	(4)	100	(4)
Engineers	33,200	28,300	28,100	26,700	1,400	200	24,400	4,600
White	27,800	24,400	24,200	22,900	1,300	100	21,100	3,300
Black	700	400	400	400	(4)	(4)	300	200
Other minorities	4,200	3,100	3,000	3,000	100	(4)	2,600	1,100
Life scientists	21,800	15,200	14,800	11,700	3,100	400	10,600	6,300
White	20,500	14,300	14,000	11,100	2,900	300	10,000	5,900
Black	500	400	300	300	100	(4)	300	100
Other minorities	600	400	400	300	100	(4)	300	200
Psychologists	16,200	10,800	10,400	7,200	3,200	400	6,700	4,300
White	15,500	10,300	10,100	7,000	3,100	300	6,500	4,100
Black	500	300	200	200	(4)	100	200	100
Other minorities	200	100	100	100	100	(4)	100	100
Social scientists	14,100	10,200	9,600	5,200	4,400	600	4,200	3,600
White	12,800	9,300	8,800	4,900	3,900	500	4,200	3,200
Black	800	600	600	200	300	100	(4)	200
Other minorities	200	100	100	100	(4)	(4)	(4)	(4)

[1] Includes full-time graduate students.

[2] Excludes full-time graduate students.

[3] Overall, 98 percent of "Other minorities" are classified as Asians.

[4] Too few cases to estimate.

Note: Detail does not add to totals because of rounding and because "No report" is excluded.

Source: National Science Foundation, unpublished data.

Appendix table 50.—Recent science and engineering degree recipients by field, sex, degree level, labor force participation rates, science and engineering utilization rates, and unemployment rates: 1978 and 1979 in 1980

	Labor force participation rates		Science and engineering utilization rates		Unemployment rates	
Field and degree level	Men	Women	Men	Women	Men	Women
			Bachelor's			
All fields	98.3	93.7	58.1	36.8	3.2	4.3
Physical scientists	97.4	92.8	76.2	73.2	2.6	1.7
Mathematical scientists	99.0	94.8	60.3	59.3	4.0	1.9
Computer specialists	99.5	100.0	90.6	94.4	1.6	2.9
Environmental scientists	98.3	89.6	57.5	49.7	4.6	7.9
Engineers	99.2	99.4	91.5	90.9	1.4	1.3
Life scientists	97.4	93.9	50.4	49.0	4.0	7.1
Psychologists	99.2	92.5	18.4	17.0	3.6	2.9
Social scientists	97.2	93.4	17.7	19.4	5.4	4.3
			Master's			
All fields	98.7	92.1	83.8	67.4	1.2	5.4
Physical scientists	96.4	100.0	87.0	69.0	1.7	4.8
Mathematical scientists	100.0	91.4	71.7	69.9	3.6	1.9
Computer specialists	99.1	90.3	93.8	89.1	(1)	(1)
Environmental scientists	99.5	93.4	88.4	76.6	1.8	(1)
Engineers	99.2	95.0	94.9	86.0	0.2	8.2
Life scientists	99.8	94.5	77.5	76.5	1.1	5.2
Psychologists	94.9	87.7	70.8	62.2	0.8	6.6
Social scientists	87.9	94.1	55.7	41.8	4.5	7.9

[1] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 51.—Recent science and engineering degree recipients by field, race, degree level, labor force participation rates, science and engineering utilization rates, and unemployment rates: 1978 and 1979 in 1980

	Labor force participation rates			Science and engineering utilization rates			Unemployment rates		
Field and degree level	White	Black	Other	White	Black	Other	White	Black	Other
Bachelor's									
All fields	96.7	95.9	98.1	51.4	39.2	58.2	3.3	9.3	4.8
Physical scientists	96.2	100.0	100.0	75.2	71.8	98.9	2.2	1.0	(1)
Mathematical scientists	98.3	84.0	100.0	58.5	87.4	86.9	3.2	(1)	(1)
Computer specialists	99.5	100.0	100.0	94.5	65.9	100.0	0.4	15.9	(1)
Environmental scientists	96.0	100.0	100.0	55.7	40.6	86.4	5.4	(1)	13.6
Engineers	99.2	100.0	100.0	91.7	85.5	94.7	1.2	4.2	3.2
Life scientists	96.2	92.4	94.5	50.0	52.3	46.4	5.1	2.7	10.4
Psychologists	94.7	98.1	100.0	18.1	12.9	12.6	2.8	9.0	(1)
Social scientists	95.6	94.3	100.0	18.6	19.0	(1)	4.3	13.3	(1)
Master's									
All fields	97.2	92.3	97.9	79.4	64.5	93.2	2.0	12.8	0.9
Physical scientists	96.7	100.0	100.0	82.8	64.0	100.0	2.0	11.4	(1)
Mathematical scientists	96.5	100.0	100.0	70.5	100.0	79.9	3.1	(1)	(1)
Computer specialists	96.9	100.0	100.0	92.1	100.0	100.0	(1)	(1)	(1)
Environmental scientists	98.0	100.0	100.0	85.6	(1)	100.0	1.5	(1)	(1)
Engineers	99.5	76.0	98.9	93.9	100.0	96.6	0.6	(1)	1.3
Life scientists	98.2	100.0	92.3	77.2	72.2	79.6	2.2	12.8	(1)
Psychologists	91.1	100.0	100.0	67.4	48.3	46.3	2.8	38.8	(1)
Social scientists	97.2	92.4	73.4	52.6	40.4	60.4	5.4	10.4	(1)

[1] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 52.—Median annual salaries of recent science and engineering degree recipients by field, sex, race and degree level: 1978 and 1979 in 1980

Field and degree level	Total	Men	Women	White	Black	Other minorities
Bachelor's						
All fields	$14,853	$17,022	$11,815	$14,884	$12,840	$16,755
Physical scientists	15,070	15,576	13,962	15,059	14,180	10,675
Chemists	15,653	16,194	14,326	15,657	16,611	12,613
Physicists/Astronomers	17,316	17,513	16,708	17,103	5,376	(1)
Environmental scientists	14,189	14,594	12,359	14,231	11,187	10,378
Other physical scientists	15,076	16,818	11,899	15,076	(1)	(1)
Mathematical scientists	17,294	17,795	16,500	17,212	19,260	17,811
Mathematicians/ Statisticians	15,780	15,941	15,665	15,610	19,820	13,209
Computer specialists	18,763	18,986	18,063	18,854	17,761	17,966
Engineers	20,801	20,748	21,335	20,782	22,667	20,592
Life scientists	12,069	12,788	11,255	12,074	12,126	13,114
Biological scientists	11,872	12,391	11,387	11,876	12,208	12,937
Agricultural scientists	12,377	13,094	10,895	12,388	11,745	13,639
Psychologists	11,243	12,341	10,789	11,257	10,327	14,285
Social scientists	12,162	13,616	11,053	12,228	10,847	13,744
Economists	14,568	15,010	12,655	14,728	11,138	13,311
Sociologists/Anthropologists	11,936	13,922	10,872	11,983	11,455	13,413
Other social scientists	12,373	12,980	11,848	12,526	9,945	19,456
Master's						
All fields	20,567	21,767	15,595	20,357	18,737	22,936
Physical scientists	20,249	20,671	18,319	20,327	20,056	19,038
Chemists	19,151	19,661	17,067	19,019	19,641	13,564
Physicists/Astronomers	20,504	19,625	22,286	20,304	23,552	20,909
Environmental scientists	21,806	22,118	20,099	21,911	23,552	19,673
Other physical scientists	17,094	17,408	16,687	17,094	(1)	(1)
Mathematical scientists	21,961	23,012	18,190	21,992	29,665	21,434
Mathematicians/ Statisticians	19,134	20,390	14,328	19,042	19,456	23,552
Computer specialists	24,695	25,597	22,117	25,146	30,676	21,123
Engineers	24,513	24,593	23,231	24,572	26,184	23,840
Life scientists	15,077	15,728	14,342	15,063	16,947	14,867
Biological scientists	14,263	14,491	14,069	14,202	17,024	5,604
Agricultural scientists	16,799	16,895	16,391	16,827	16,529	16,802
Psychologists	15,113	15,757	14,487	15,109	17,899	(1)
Social scientists	16,204	17,128	14,489	16,324	12,948	16,731
Economists	20,422	20,718	17,390	20,623	17,408	17,408
Sociologists/Anthropologists	15,228	16,613	13,679	15,473	11,104	11,977
Other social scientists	17,071	17,616	14,339	17,751	12,803	(1)

[1] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 53.—Percent distribution of recent science and engineering degree recipients by field, sex, degree level, and reason for non-S/E employment: 1978 and 1979 in 1980

	Total non-S/E		Prefer non-S/E		Promoted out		Better pay		Locational preference		Believe S/E job not available		Other [1]	
Field and degree level	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
							Bachelor's							
All fields	100.0	100.0	50.9	58.3	1.7	0.7	16.0	10.0	4.1	5.0	20.6	22.6	6.6	3.4
Physical scientists	100.0	100.0	58.7	69.9	2.2	(2)	9.7	4.6	4.2	3.6	13.8	7.4	11.3	14.6
Mathematical scientists	100.0	100.0	70.1	75.5	4.5	1.4	3.0	(2)	6.0	8.0	13.5	13.7	3.0	1.4
Computer specialists	100.0	100.0	57.4	(2)	7.1	(2)	(2)	(2)	(2)	(2)	7.2	100.0	28.3	(2)
Environmental scientists	100.0	100.0	43.7	45.3	2.0	(2)	25.0	10.9	1.0	8.0	24.7	35.8	3.6	(2)
Engineers	100.0	100.0	48.9	51.8	6.7	25.5	21.8	22.7	2.4	(2)	8.5	(2)	11.0	(2)
Life scientists	100.0	100.0	47.6	65.2	0.6	(2)	18.0	4.7	5.1	3.2	22.5	25.5	6.1	1.4
Psychologists	100.0	100.0	43.7	57.0	2.2	0.9	18.4	11.3	5.0	5.0	24.3	23.1	6.5	2.8
Social scientists	100.0	100.0	54.6	55.0	1.0	0.4	14.0	12.2	3.6	5.5	20.8	21.8	6.1	4.8
							Master's							
All fields	100.0	100.0	72.7	72.5	1.6	1.5	6.7	3.5	1.8	4.7	11.6	16.9	5.0	0.8
Physical scientists	100.0	100.0	100.0	72.8	(2)	(2)	(2)	(2)	(2)	26.8	(2)	(2)	(2)	(2)
Mathematical scientists	100.0	100.0	71.5	78.5	(2)	(2)	(2)	(2)	(2)	7.0	14.0	14.5	14.6	(2)
Computer specialists	100.0	100.0	71.4	100.0	28.6	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Environmental scientists	100.0	100.0	72.9	65.3	8.8	8.3	11.2	(2)	(2)	10.9	7.1	6.7	(2)	8.3
Engineers	100.0	100.0	75.0	81.1	(2)	18.9	8.2	(2)	(2)	(2)	5.8	(2)	11.0	(2)
Life scientists	100.0	100.0	68.7	67.6	(2)	(2)	6.9	8.1	2.9	5.7	18.6	18.5	2.9	(2)
Psychologists	100.0	100.0	72.6	79.0	2.7	2.5	10.9	5.6	4.1	2.5	9.6	10.5	(2)	(2)
Social scientists	100.0	100.0	71.4	64.0	(2)	(2)	6.6	1.5	1.9	2.3	12.6	30.7	5.5	1.5

[1] Includes "No report."

[2] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 54.—Percent distribution of recent science and engineering degree recipients by field, race, degree level, and reason for non-S/E employment: 1978 and 1979 in 1980

	Total non-S/E		Prefer non-S/E		Promoted out		Better pay		Locational preference		Believe S/E job not available		Other [1]	
Field and race	Bachelor	Master's	Bach.	Mast.	Bach.	Mast.	Bach.	Mast.	Bach.	Mast.	Bach.	Mast.	Bach.	Mast.
All fields	100.0	100.0	54.1	72.7	1.3	1.6	13.4	5.6	4.5	2.9	21.5	13.5	5.2	3.5
White	100.0	100.0	54.8	72.0	1.2	1.7	13.3	5.5	4.4	3.1	21.1	13.8	5.2	3.7
Black	100.0	100.0	45.4	88.8	1.4	(2)	7.1	(2)	4.8	(2)	34.9	11.2	6.3	(2)
Other minorities	100.0	100.0	42.7	57.7	(2)	(2)	26.8	26.9	11.1	(2)	19.3	15.4	(2)	(2)
Physical scientists	100.0	100.0	61.9	89.9	1.5	(2)	8.2	(2)	4.1	10.0	11.9	(2)	12.3	(2)
White	100.0	100.0	62.7	88.9	1.6	(2)	9.4	(2)	3.3	10.7	12.3	(2)	12.7	(2)
Black	100.0	100.0	54.8	100.0	(2)	(2)	(2)	(2)	45.1	(2)	(2)	(2)	(2)	(2)
Other minorities	100.0	100.0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Mathematical scientists	100.0	100.0	72.7	74.2	3.0	(2)	1.6	(2)	7.0	2.7	13.6	14.1	2.2	9.0
White	100.0	100.0	72.6	76.3	3.1	(2)	1.6	(2)	7.1	2.8	13.2	11.8	2.3	9.3
Black	100.0	100.0	49.4	(2)	(2)	(2)	(2)	(2)	(2)	(2)	50.6	(2)	(2)	(2)
Other minorities	100.0	100.0	100.0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	100.0	(2)	(2)
Computer specialists	100.0	100.0	50.4	80.1	6.2	19.9	(2)	(2)	(2)	(2)	18.7	(2)	24.9	(2)
White	100.0	100.0	72.9	80.1	9.0	19.9	(2)	(2)	(2)	(2)	9.1	(2)	9.0	(2)
Black	100.0	100.0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	39.6	(2)	60.4	(2)
Other minorities	100.0	100.0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Environmental scientists	100.0	100.0	44.2	70.0	1.5	8.8	21.4	6.8	2.8	4.3	27.5	7.0	2.7	3.3
White	100.0	100.0	43.0	69.0	1.5	9.1	22.2	7.0	2.9	4.5	27.7	7.2	2.8	3.4
Black	100.0	100.0	66.1	100.0	(2)	(2)	(2)	(2)	(2)	(2)	33.9	(2)	(2)	(2)
Other minorities	100.0	100.0	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Engineers	100.0	100.0	49.1	75.4	8.3	1.3	21.9	7.7	2.2	(2)	7.8	5.4	10.1	10.2
White	100.0	100.0	51.0	76.1	5.5	1.4	21.1	6.2	2.4	(2)	8.4	5.6	11.0	10.7
Black	100.0	100.0	35.9	(2)	64.1	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Other minorities	100.0	100.0	(2)	60.9	(2)	(2)	100.0	39.1	(2)	(2)	(2)	(2)	(2)	(2)
Life scientists	100.0	100.0	54.0	68.4	0.4	(2)	13.2	7.2	4.4	3.7	23.6	18.6	4.4	2.1
White	100.0	100.0	53.9	68.5	0.4	(2)	13.4	6.1	4.1	3.8	23.5	19.4	4.7	2.2
Black	100.0	100.0	32.3	100.0	(2)	(2)	6.4	(2)	(2)	(2)	61.1	(2)	(2)	(2)
Other minorities	100.0	100.0	53.0	(2)	(2)	(2)	16.9	100.0	25.4	(2)	4.6	(2)	(2)	(2)
Psychologists	100.0	100.0	51.6	76.0	1.4	2.6	14.2	8.1	5.0	3.2	23.6	10.1	4.2	(2)
White	100.0	100.0	52.7	74.7	1.5	2.7	13.6	8.5	4.9	3.4	23.8	10.6	3.6	(2)
Black	100.0	100.0	39.6	100.0	(2)	(2)	11.6	(2)	6.2	(2)	29.3	(2)	13.3	(2)
Other minorities	100.0	100.0	55.9	100.0	(2)	(2)	32.7	(2)	11.4	(2)	(2)	(2)	(2)	(2)
Social scientists	100.0	100.0	54.8	68.6	0.7	(2)	13.2	4.7	4.4	2.0	21.2	19.4	5.6	4.0
White	100.0	100.0	55.4	65.8	0.8	(2)	13.3	5.3	4.3	2.3	20.1	20.5	5.9	4.6
Black	100.0	100.0	54.0	83.1	(2)	(2)	5.6	(2)	4.8	(2)	35.6	16.9	(2)	(2)
Other minorities	100.0	100.0	26.5	100.0	(2)	(2)	29.0	(2)	(2)	(2)	44.6	(2)	(2)	(2)

[1] Includes "No report."

[2] Too few cases to estimate.

Source: National Science Foundation, unpublished data.

Appendix table 55.—Science and engineering bachelor's and first-professional degree recipients by field and sex: 1970-80

Year	Total S/E	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]
			Total			
1970	264,122	21,551	44,772	29,109	52,129	116,561
1971	271,176	21,549	45,387	27,306	51,461	125,473
1972	281,228	20,887	46,003	27,250	53,484	133,604
1973	295,391	20,809	46,989	27,528	59,486	140,579
1974	305,062	21,287	43,530	26,570	68,226	145,449
1975	294,920	20,896	40,065	23,385	72,710	137,864
1976	292,174	21,559	39,114	21,749	77,301	132,451
1977	288,543	22,618	41,581	20,729	78,472	125,143
1978	288,167	23,175	47,411	19,925	77,138	120,518
1979	288,625	23,363	53,720	20,670	75,085	115,787
1980	292,271	23,682	59,903	22,594	71,630	114,462
			Men			
1970	195,244	18,582	44,434	18,593	40,254	73,381
1971	198,180	18,535	45,022	17,488	39,658	77,477
1972	203,557	17,739	45,502	17,466	40,790	82,060
1973	211,552	17,688	46,409	17,543	44,916	84,996
1974	213,269	17,751	42,824	16,851	50,390	85,453
1975	201,578	17,058	39,205	14,729	51,899	78,687
1976	196,577	17,420	37,671	14,071	53,512	73,903
1977	191,090	18,067	39,495	13,241	52,863	67,424
1978	188,107	18,188	43,914	12,815	50,184	63,006
1979	186,333	18,076	48,801	13,249	47,537	58,670
1980	186,487	18,035	53,831	14,373	44,024	56,224
			Women			
1970	68,878	2,969	338	10,516	11,875	43,180
1971	72,996	3,014	365	9,818	11,803	47,996
1972	77,671	3,148	501	9,784	12,694	51,544
1973	83,839	3,121	580	9,985	14,570	55,583
1974	91,793	3,536	706	9,719	17,836	59,996
1975	93,342	3,838	860	8,656	20,811	59,177
1976	95,597	4,139	1,443	7,678	23,789	58,548
1977	97,453	4,551	2,086	7,488	25,609	57,719
1978	100,060	4,987	3,497	7,110	26,954	57,512
1979	102,292	5,287	4,919	7,421	27,548	57,117
1980	105,784	5,647	6,072	8,221	27,606	58,238

[1] Includes environmental science.

[2] Includes computer specialties.

[3] Includes psychology.

Source: National Center for Education Statistics, Earned Degrees (annual series) and National Science Foundation.

Appendix table 56.—Science and engineering master's degree recipients by field and sex: 1970-80

Year	Total	Physical sciences [1]	Engineering	Mathematical sciences [2]	Life sciences	Social sciences [3]
			Total			
1970	49,318	5,948	15,597	7,107	8,590	12,076
1971	50,624	6,386	16,347	6,789	8,320	12,782
1972	53,567	6,307	16,802	7,186	8,914	14,358
1973	54,234	6,274	16,758	7,146	9,080	14,976
1974	54,175	6,087	15,393	7,116	9,605	15,974
1975	53,852	5,830	15,434	6,637	9,618	16,333
1976	54,747	5,485	16,170	6,466	9,823	16,803
1977	56,731	5,345	16,889	6,496	10,707	17,294
1978	56,237	5,576	17,015	6,421	10,711	16,514
1979	54,456	5,464	16,193	6,101	10,719	15,979
1980	54,463	5,279	16,888	6,480	10,264	15,552
			Men			
1970	40,741	5,101	15,425	5,298	6,374	8,543
1971	41,966	5,533	16,160	5,101	6,130	9,042
1972	44,010	5,419	16,521	5,409	6,587	10,074
1973	44,474	5,427	16,470	5,416	6,843	10,318
1974	43,630	5,200	15,031	5,323	7,195	10,881
1975	42,847	4,982	15,038	4,871	7,207	10,749
1976	42,675	4,660	15,581	4,776	7,204	10,454
1977	43,577	4,458	16,156	4,730	7,696	10,537
1978	42,547	4,630	16,144	4,704	7,485	9,584
1979	40,416	4,472	15,203	4,469	7,259	9,013
1980	40,010	4,280	15,695	4,670	6,943	8,422
			Women			
1970	8,577	847	172	1,809	2,216	3,533
1971	8,658	853	187	1,688	2,190	3,740
1972	9,557	888	281	1,777	2,327	4,284
1973	9,760	847	288	1,730	2,237	4,658
1974	10,545	887	362	1,793	2,410	5,093
1975	11,005	848	396	1,766	2,411	5,584
1976	12,072	825	589	1,690	2,619	6,359
1977	13,154	887	733	1,766	3,011	6,757
1978	13,690	946	871	1,717	3,226	6,930
1979	14,040	992	990	1,632	3,460	6,966
1980	14,453	999	1,193	1,810	3,321	7,130

[1] Includes environmental science.

[2] Includes computer specialties.

[3] Includes psychology.

Source: National Center for Education Statistics, Earned Degrees Conferred (annual series) and the National Science Foundation.

Appendix table 57.—Science and engineering doctorate recipients by field and sex: 1970-80

Year	Total S/E	Physical sciences [1]	Engineering	Mathematical sciences [2]	Life sciences	Social sciences [3]
			Total			
1970	17,639	4,313	3,681	1,343	4,131	4,171
1971	18,466	4,391	3,654	1,327	4,534	4,560
1972	18,412	4,103	3,704	1,295	4,478	4,832
1973	18,598	4,016	3,560	1,264	4,524	5,234
1974	17,865	3,631	3,336	1,229	4,220	5,449
1975	17,784	3,628	3,151	1,188	4,252	5,565
1976	17,288	3,433	2,835	1,100	4,203	5,717
1977	16,937	3,344	2,599	1,039	4,199	5,756
1978	16,196	3,137	2,442	1,001	4,179	5,437
1979	16,363	3,104	2,517	966	4,403	5,373
1980	17,195	3,151	2,479	963	4,710	5,892
			Men			
1970	16,112	4,077	3,657	1,245	3,632	3,501
1971	16,666	4,145	3,631	1,231	3,910	3,749
1972	16,502	3,830	3,679	1,194	3,831	3,968
1973	16,310	3,742	3,496	1,147	3,790	4,135
1974	15,453	3,378	3,281	1,120	3,488	4,186
1975	15,147	3,326	3,084	1,064	3,470	4,203
1976	14,502	3,133	2,766	983	3,412	4,208
1977	13,979	3,024	2,525	911	3,408	4,111
1978	13,157	2,825	2,385	862	3,307	3,778
1979	13,053	2,754	2,434	814	3,429	3,622
1980	13,399	2,765	2,389	847	3,563	3,835
			Women			
1970	1,527	236	24	98	499	670
1971	1,800	246	23	96	624	811
1972	1,910	273	25	101	647	864
1973	2,288	274	64	117	734	1,099
1974	2,412	253	55	109	732	1,263
1975	2,637	302	67	124	782	1,362
1976	2,786	300	69	117	791	1,509
1977	2,958	320	74	128	791	1,645
1978	3,039	312	57	139	872	1,659
1979	3,310	350	83	152	974	1,751
1980	3,796	386	90	116	1,147	2,057

[1] Includes environmental science.

[2] Includes computer specialties.

[3] Includes psychology.

Source: National Academy of Sciences and National Science Foundation.

Appendix table 58.— Graduate degree attainment rates, by sex: 1972-80

Bachelor's degrees		Master's degrees		Attainment rate	Bachelor's degrees		Doctoral degrees		Attainment rates
Year	Number	Year	Number		Year	Number	Year	Number	
				Men					
1970	195,244	1972	44,010	22.5	1965	128,723	1972	16,502	12.8
1971	198,180	1973	44,474	22.4	1966	133,989	1973	16,310	12.2
1972	203,557	1974	43,630	21.4	1967	143,847	1974	15,453	10.7
1973	211,552	1975	42,847	20.3	1968	158,711	1975	15,147	9.5
1974	213,269	1976	42,675	20.0	1969	181,323	1976	14,502	8.0
1975	201,578	1977	43,577	21.6	1970	195,244	1977	13,979	7.2
1976	196,577	1978	42,547	21.6	1971	198,180	1978	13,157	6.6
1977	191,090	1979	40,416	21.2	1972	203,557	1979	13,053	6.4
1978	188,107	1980	40,010	21.3	1973	211,552	1980	13,399	6.3
				Women					
1970	68,878	1972	9,557	13.9	1965	36,213	1972	1,910	5.3
1971	72,996	1973	9,760	13.4	1966	39,482	1973	2,288	5.8
1972	77,671	1974	10,545	13.6	1967	44,002	1974	2,412	5.5
1973	83,839	1975	11,005	13.1	1968	53,463	1975	2,637	4.9
1974	91,793	1976	12,072	13.2	1969	63,196	1976	2,786	4.4
1975	93,342	1977	13,154	14.1	1970	68,878	1977	2,958	4.3
1976	95,597	1978	13,690	14.3	1971	72,996	1978	3,039	4.2
1977	97,453	1979	14,040	14.4	1972	77,671	1979	3,310	4.3
1978	100,060	1980	14,453	14.4	1973	83,839	1980	3,796	4.5

Source: National Center for Education Statistics and National Science Foundation, unpublished data.

Appendix table 59.—Science and engineering earned degrees by field, race, and degree level: 1978/79

Field and race	Bachelor's	Master's	Doctorates
Total			
All fields	322,195	50,201	14,414
Physical sciences	22,659	4,713	2,617
Mathematical sciences	11,534	2,571	568
Computer specialties	8,392	2,528	188
Engineering	58,003	11,417	1,635
Life sciences	71,442	9,697	3,887
Psychology	42,561	7,852	2,588
Social sciences	107,604	11,423	2,931
White			
All fields	284,852	45,185	13,184
Physical sciences	20,958	4,373	2,415
Mathematical sciences	10,229	2,352	520
Computer specialties	7,404	2,273	175
Engineering	52,651	10,082	1,403
Life sciences	64,445	8,909	3,613
Psychology	36,648	7,078	2,380
Social sciences	92,517	10,118	2,678
Black			
All fields	18,743	1,988	394
Physical sciences	704	86	48
Mathematical sciences	652	71	13
Computer specialties	507	65	4
Engineering	1,775	246	25
Life sciences	2,837	296	61
Psychology	3,218	476	111
Social sciences	9,050	748	132
Asian			
All fields	7,080	1895	590
Physical sciences	439	160	121
Mathematical sciences	324	104	29
Computer specialties	263	149	8
Engineering	1,858	850	183
Life sciences	1,788	309	161
Psychology	781	87	23
Social sciences	1,627	236	65
Hispanics			
All fields	10,333	970	203
Physical sciences	495	65	25
Mathematical sciences	288	36	6
Computer specialties	207	25	1
Engineering	1,555	215	22
Life sciences	2,139	162	46
Psychology	1,737	191	64
Social sciences	3,912	276	39

Source: National Center for Education Statistics and National Academy of Sciences, Doctorate Record File.

Appendix table 60.—Postdoctorates in science and engineering by field and sex: 1973, 1977, and 1979

	Men			Women		
Field	1973	1977	1979	1973	1977	1979
All fields	4,800	7,700	8,000	900	2,000	2,200
Physical scientists	1,700	2,300	1,900	100	300	300
Mathematical scientists	100	100	200	(1)	(1)	(1)
Computer specialists	(1)	(1)	(1)	(1)	(1)	(1)
Environmental scientists	200	300	300	(1)	(1)	(1)
Engineers	200	400	200	(1)	(1)	(1)
Life scientists	2,200	3,900	4,700	600	1,300	1,500
Psychologists	200	400	400	100	200	200
Social scientists	200	400	300	(1)	100	100

[1] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 61.—Postdoctorates in science and engineering by field and race: 1973, 1977, and 1979

	White			Black			Asian			Other [1]		
Field	1973	1977	1979	1973	1977	1979	1973	1977	1979	1973	1977	1979
All fields	5,000	8,100	8,600	(2)	100	100	500	1,300	1,200	100	300	400
Physical scientists	1,600	2,000	1,700	(2)	(2)	(2)	200	400	400	(2)	100	100
Mathematical scientists	100	100	100	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	100
Computer specialists	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Environmental scientists	200	300	300	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Engineers	200	200	200	(2)	(2)	(2)	(2)	100	100	(2)	(2)	(2)
Life scientists	2,500	4,000	5,400	(2)	100	(2)	300	600	500	(2)	100	200
Psychologists	200	500	600	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
Social scientists	200	400	500	(2)	(2)	(2)	(2)	(2)	100	(2)	(2)	(2)

[1] Includes American Indians and "No report."

[2] Too few cases to estimate.

Note: Detail may not add to totals because of rounding.

Source: National Science Foundation, Characteristics of Doctoral Scientists and Engineers in the United States (biennial series, 1977-79) and unpublished data.

Appendix table 62.—Graduate Record Examination (GRE) scores by sex, race, and undergraduate major: 1978/79

Sex and race	Physical science	Mathematical science	Engineering	Biological science	Behavioral science	Social science
Men						
Verbal	514	510	465	485	506	452
Quantitative	640	682	661	577	522	501
Analytical	555	568	525	518	509	473
Women						
Verbal	534	498	497	500	509	457
Quantitative	600	636	603	528	479	446
Analytical	564	565	534	526	513	469
White						
Verbal	541	537	527	521	528	484
Quantitative	639	682	675	569	514	496
Analytical	581	602	587	553	535	506
Black						
Verbal	391	364	403	358	386	343
Quantitative	462	486	521	381	366	337
Analytical	406	401	437	359	371	333
Asian						
Verbal	495	476	459	494	503	453
Quantitative	658	660	675	596	528	494
Analytical	546	549	533	537	510	464

Source: Cheryl L. Wild, *A Summary of Data Collected From Graduate Record Examination Test-Takers During 1978/79, Data Summary Report #4* (Princeton, N.J.: Educational Testing Service, March 1980), pp. 68-70, 76-78.

Appendix table 63.–Graduate Record Examination (GRE) scores by undergraduate major and Hispanic orgin: 1978/79

Undergraduate major	Mexican American			Puerto Rican			Latin American		
	Verbal	Quantitative	Analytical	Verbal	Quantitative	Analytical	Verbal	Quantitative	Analytical
Physical science	509	600	516	418	532	433	509	592	524
Mathematical science	420	595	467	375	550	412	468	626	530
Engineering	434	595	487	390	583	439	476	624	520
Biological science	407	448	421	398	450	401	473	509	484
Behavioral science	446	427	435	399	387	382	481	460	473
Social science	409	413	404	363	378	362	465	429	448

Source: Cheryl L. Wild, A Summary of Data Collected From Graduate Record Examination Test-Takers During 1978-79, Data Summary Report #4 (Princeton, N.J.: Educational Testing Service, March 1980), pp. 76-78.

Appendix table 64.—Scholastic Aptitude Test (SAT) score averages for college-bound seniors: 1970-80

	Verbal			Mathematical		
Year	Male	Female	Total	Male	Female	Total
1970	459	461	460	509	465	488
1971	454	457	455	507	466	488
1972	454	452	453	505	461	484
1973	446	443	445	502	460	481
1974	447	442	444	501	459	480
1975	437	431	434	495	449	472
1976	433	430	431	497	446	472
1977	431	427	429	497	445	470
1978	433	425	429	494	444	468
1979	431	423	427	493	443	467
1980	428	420	424	491	443	466

Source: Admissions Testing Program of the College Board, College-Bound Seniors (annual series).

Appendix table 65.—Scholastic Aptitude Test (SAT) scores for college-bound seniors by race: 1976/77

Race	Verbal	Mathematical
Whites	449	490
Blacks	329	355
Chicanos	374	412

Source: Robert L. Jacobsen, "Blacks Lag in SAT Scores," The Chronicle of Higher Education, January 7, 1980, Vol. XIX, No. 16, p. 5.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1982 - 369-623/8146